OTTAWA NATIONAL WILDLIFE REFUGE COMPLEX

(OTTAWA, CEDAR POINT, WEST SISTER ISLAND NWR's)

Oak Harbor, Ohio

ANNUAL NARRATIVE REPORT

Calendar Year 1990

Mark W Blair — 8-2-91

Refuge Manager — Date

Matthew J. Kirschbaum — 8.5.91

Refuge Supervisor Review — Date

John R. Eadie — 8/06/91

Regional Office Approval — Date

INTRODUCTION

The Ottawa National Wildlife Refuge Complex is made up of three refuges and five separate units: the Ottawa Refuge has three units -Ottawa, Navarre and Darby; Cedar Point Refuge; and West Sister Island Refuge.

The Ottawa Division was established in July, 1961 with land acquired under the authority of the Migratory Bird Conservation Act to preserve a portion of the remaining Lake Erie marshes. West Sister Island was established as a refuge in August, 1938 by Presidential Order. Cedar Point was donated to the Service and accepted by the Interior in December 1964. Darby was acquired in 1966 in exchange for Navarre, with the agreement that most of Navarre would remain under management for wildlife under conditions of a 25- and 50-year lease.

Today, these five separate parcels of land are the Ottawa National Wildlife Refuge Complex.

The cities of Toledo, Detroit, and Ann Arbor are within 2 hours drive of Ottawa NWR. At between 2 to 3 hours driving distance are Cleveland, Akron, Columbus, and Dayton. The refuge is within the bounds of an 8 million person megalopolis. Currently, it is receiving about 100,000 visitors per year who primarily visit the refuge for bird watching and wildlife observation.

The total refuge acreage is 8,316 acres of which 5,350 acres are either open pools, marsh, or moist soil units. Water levels in 3,306 acres can be controlled by gravity drainage and filling; in 1,250 acres water is uncontrolled; 576 acres of marsh are controlled by pumps; and in 794 acres of moist soil units water levels are controlled by pumping. The remaining acreage of 2,966 is a mixture of grassland, forest and cropland.

Wildlife use of the refuge is high and is approximately as follows; (use days) ducks, 1 to 5 million; Canada geese 1 to 2 million; marsh and water birds, 1 million; shorebirds gulls and terns over 1 million. Production is: ducks and geese 500 to 2,000 each; marsh and water birds, 4,000 to 6,000; shorebirds, gulls and terns, up to 500; bald eagles, 2 to 5, and wetland mammals 6,000 to 10,000.

West Sister Island, located 9 miles out in Lake Erie, is a wilderness area and is the site of the largest colonial nesting bird colony in the Great Lakes chain.

*NTR - Nothing to report

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F. HABITAT MANAGEMENT (cont.)

G. WILDLIFE

H. PUBLIC USE

H. PUBLIC USE (cont.)

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

A. HIGHLIGHTS

The volunteer program reached a new high with a total of 3,998 hours donated by 422 individuals (E.4).

The Lake Erie Shoreline Protection Study was awarded to the National Fisheries Center-Great Lakes (D.6).

Wetland restoration and Farm Bill activities were once again a major factor during the year (F.15).

One hundred and twelve teachers participated in six environmental education workshops conducted by refuge staff on Ottawa NWR (H.3)

The flood damage construction program came to an end after three active years (I.2)

B. CLIMATIC CONDITIONS

TABLE 1. Annual Precipitation and Temperatures, CY 1990

Month	Precipitation		Snowfall		Temperature			
	CY-1990	Average	CY-1990	Average	Max.	Min.	Ave. Max.	Ave. Min.
January	1.63	1.61	2.25	9.99	54	15	51	- 6
February	4.80	1.43	2.86	8.11	65	9	53	- 3
March	1.45	2.55	1.50	4.69	81	20	69	9
April	1.00	2.92	0.00	0.84	91	26	82	21
May	5.73	3.11	0.00	0.00	81	40	87	33
June	1.15	3.77			91	42	93	44
July	2.39	3.49			101	57	94	50
August	4.26	3.58			93	53	92	47
September	3.07	3.31			93	40	89	38
October	3.45	2.41			85	31	79	25
November	2.47	3.02		1.91	73	26	68	17
December	6.13	2.81	2.00	6.48	56	8	57	2
TOTALS	37.53	34.01	8.61	32.02				
EXTREMES					101	8	94	- 6

* Averages were calculated by averaging data from 1964 through 1990.

An official National Weather Service station is located at the refuge headquarters and is monitored daily for precipitation and temperature. An automatic temperature recorder has lessened the need for recording temperatures daily.

Precipitation in 1990 was slightly above average. February, May, August and December were the wettest months while April and June were the driest. Flooding occurred in May, November and December. Snow accumulation was way below normal with little or no snow occurring during the winter months. The month with the most extremes was February where unseasonably warm days (in the 60's) contrasted with blizzard conditions. An ice storm occurred on February 14 causing power lines to snap and leaving many without power including the refuge buildings. Blizzard conditions occurred on February 24 bringing winds in excess of 60 mph and 2 inches of snow.

Temperatures for the year were relatively mild. During the month of April a high temperature (91°) almost broke the record of 97° which occurred on April 21, 1987.

Krause Road after the February ice storm that damaged trees and snapped power lines. (CM)

D. PLANNING

2. Management Plan

A Water Management Program was prepared and approved for the management of all impoundment and moist soil units.

3. Public Participation

Involvement with the public was continuous throughout the year. News releases, news articles, and information was provided through the refuge mail listing of interested persons. The refuge staff also participated in numerous public information sessions including outdoor shows, conservation clubs, and career day events. A complete listing of activities can be found in section H.

4. Compliance With Environmental and Cultural Resources Mandates

All activities on the refuge requiring Army Corps of Engineer Section 10 and 404 permits and local and State compliance approval were submitted and received. Two Army Corp of Engineer permits were obtained for dike rehabilitation and ditch cleaning and underground fuel storage tank removal is progressing under Ohio EPA guidance.

5. Research and Investigations

Ottawa WMS19 - "Habitat Use and Migrational Movements of Non-Game Birds in the Lake Erie Marsh Region of NW Ohio" Mark Shieldcastle, Ohio Dept. of Natural Resources Experiment Station.

Passerine Migration Study - A long term study of passerine migration was continued on both Ottawa and Navarre units of Ottawa NWR. Data collection for a master's study on the energetic condition of the Yellow Warbler (*Dendroica petechia*) also was continued in 1990. The 1990 spring migration represented a normal movement. Major waves occurred as expected in late April, May 10 and late May. Actual dates of high densities were April 20, 21, 25 and 28 and May 8, 9, 15, 19, 20, 24, and 31.

At the Navarre study site 109 species totalling 8,011 new birds were banded in 5,905 net hours on 51 survey dates. Including returns from previous years and recaptures a total of 9,601 birds were handled. The top species banded were: Magnolia Warbler 696, White-throated Sparrow 669, Myrtle Warbler 610, Gray Catbird 357, and Swamp Sparrow 284.

The Butternut Lodge study site was surveyed by Tom Kashmer on 12 dates. 648 birds were banded of 57 different species in 444 net hours. The top species banded were: Magnolia Warbler 67, White-throated sparrow 45, Gray catbird 41, common Yellowthroat 32, and American Redstart 29.

The fall migration was less intensively studied in 1990 due to constant rains. Navarre bandings included 800 birds banded of 68 species on 14 survey dates. Large movements were noted on September 11, 28, and 29 and October 14. The most common species banded were Swainson Thrush 79, Gray Catbird 78, White-throated Sparrow 60, Yellow Warbler 60, and Gray-cheeked Thrush 59. Butternut Lodge bandings totaled 134 birds of 35 species on eight survey dates. Dominant species banded were Swainson Thrush 34, Red-eyed Vireo 13, Field Sparrow 12, and both Gray Catbird and Gray-cheeked Thrush with 10 each.

Two hundred and twelve birds banded in previous years were captured in 1990. One hundred of these were Yellow Warblers with the oldest being at least 9 years old. Twenty species were recaptured from previous years. Other species returning were Red-winged Blackbird 18, Common Yellowthroat 17, Gray Catbird 16, Indigo Bunting 10, and Prothonotary Warbler 9. A Prothonotary Warbler banded as a nestling in 1985 on the south side of Sandusky Bay was again captured as a breeding male in Navarre.

Ottawa WMS16 - "Woodcock Population and Habitat Manipulations" Mark Shieldcastle, Ohio Dept. of Natural Resources Experiment Station. Woodcock breeding habitat remains marginal on the Ottawa National Wildlife Refuge. Prairie grass fields that have faired poorly due to water inundation have become increasingly important as singing grounds. Higher elevations of marsh units also provide some habitat. Diurnal habitat appears sufficient to hold resident breeders and act as stopover sites for migrants. Eleven singing males were recorded in 1990. Incorporation of the U.S. Fish and Wildlife Service North American Woodcock Management Plan should be considered for a portion of Ottawa NWR that does not lend itself economically or practically for waterfowl management.

Ottawa WMS28 - "Movement and Habitat Usage of the Black-crowned Night Herons of the West Sister Island Rookery" Mark Shieldcastle, Ohio Dept. of Natural Resources Experiment Station. Research objectives are: (1) to determine feeding and roosting locations along Lake Erie, (2) to determine if there is a colonial interaction with the rookery in Sandusky Bay, (3) to determine migrational movements of both banded and auxiliary marked birds, (4) and to determine rookery population estimates, and habitat parameters. On-going.

This study monitors the nesting habitat usage and population status of various colonial nesting birds of West Sister Island NWR. A pilot study began in 1987 to establish an estimate of nesting pairs, colony movement and habitat parameters. The project has been incorporated into an Ohio Division of Wildlife research study conducted by the investigator through the Crane Creek Wildlife Research Station. Field work in 1990 was not accomplished due to other duties. Planned activities for the upcoming season include placement of new sample site markers to improve site location in the summer growth season. Problems faced in 1989 could not be remedied for 1990 due to budget constraints. The necessary materials have been acquired and will hopefully be in place before the nesting season in 1991. This will allow for a more uniform and complete coverage of the survey transects. Literature review has shown little to no background research on habitat preference of nesting Black-crowned Night Herons. The study will continue on an annual basis to hopefully solve this question.

TABLE 2. Project Banding to Date - West Sister Island

Species	1985	1986	1987	1988	1989	1990*
Black-Crown Night Heron	160	195	167	116	90	0
Great Blue Heron	2	1	20	2	4	0
Great Egret	12	23	37	40	33	0
Snowy Egret	7	14	4	8	5	0
Cattle Egret	12	0	4	0	1	0
Little Blue Heron	4	3	1	1	1	0
Herring Gull	16	12	35	11	33	0

*No banding done during 1990.

TABLE 3. Project Estimated Breeding Populations on West Sister Island

	Number of Nests					
Species	1985	1986	1987	1988	1989	1990
Black-Crown Night Heron	1500	1300	1320	1285	1000	1240
Great Blue Heron	500	500	1570	1500	1500	1500
Great Egret	400	400	680	700	600	1040
Snowy Egret	10	10	10	10	10	8
Cattle Egret	12	10	10	5	5	0
Little Blue Heron	2	3	3	2	2	1
Herring Gull	400	600	600	700	700	700

Ottawa WMS37 - "Effects of Wetland Water Level Manipulation on White Crappie (*Pomoxis annularis*) Production." Carol Krantz, Bill Lynch, The Ohio State University. Basic objectives of this study include: (1) to determine the age, growth and body condition of white crappie, *Pomoxis annularis*, in adjacent diked and undiked wetlands, (2) to determine if the controlled, diked wetland and the uncontrolled, natural wetland have discrete, separate white crappie stocks. The thesis for this study was completed in 1990. The following is an excerpt from the abstract.

"We sampled 239 white crappie *Pomoxis annularis* (50-374 mm) during April and May 1989 from three diked wetlands and two adjacent, open water areas on Lake Erie. Mean lengths at ages 1-6, mean growth between ages 1-2, and PSD values were the highest form white crappie populations in the two open areas. No differences were found in body condition of the white crappie between any of the study sites. The greatest diversity of species and the highest total CPUE was from the two open water areas. These differences strongly point to a lack of mixing between white crappie in diked wetlands and the larger lake community, a form of isolation. Accessibility problems inherent in the basic design of diked wetlands also strongly point to the isolation of fish communities within these habitats. Despite the fact that better

habitat (in terms of habitat diversity and vegetation) exists within the diked wetlands, limited access apparently is causing several fish species not to use this more suitable habitat. Diked wetlands do not contain unique wetland fish species. Differences among these diked wetlands in white crappie population structure and fish community interactions occur in response to their isolation. Localized water quality, habitat, and predator-prey interactions appear to be important in structuring diked wetland fish communities due to their relative isolation from Lake Erie."

Ottawa WMS38 - "Ecological and Genetic Analysis of Lake Erie Water Snakes and Melanistic Garter Snakes." Richard B. King, Department of Biological Sciences, Indiana University. Objectives of this study are to provide an ecological and genetic analysis of Lake Erie island and mainland populations of two species of snakes, the water snake *Nerodia sipedon* and the garter snake *Thamnophis sirtalis*. This information is needed to determine the current status of these snakes in the Lake Erie area of Ohio, to aid in future management decisions and to identify the processes responsible for the remarkable degree of color pattern variation which characterizes these populations. Data was not collected in 1990. Ongoing.

Ottawa WMS40 - "Physioecology of Fall Migrating American Black Ducks in the Lake Erie Marshes. Joe Robb, Ohio State University, Doctoral Thesis. The objectives of this study are: (1) to determine migration patterns and length of stay of black ducks in southwestern Lake Erie marshes, (2) to identify habitat use and local movements of staging black ducks (i.e., use of grain fields vs. natural marshes), (3) to determine temporal survival of black ducks and mortality factors in the staging area, (4) to determine body weight and condition of migrating black ducks and to denote seasonal, age-sex, and sub-flock differences, and (5) to relate temporal survival with body condition and habitat use.

Field work in October-December revolved around trapping ducks. We constructed a large (18 m x 33 m) permanent swim-in trap at Ottawa National Wildlife Refuge (NWR). The trap was constructed of plastic-coated chicken wire on the sides with a nylon-net top. Galvanized welded wire was placed in a trench on the bottom of the trap to prevent entry of predators. Seven funnels were also placed on the lower levels of the trap. The trap was placed on a graded area, so the top portion of the trap would be on high ground when the moist-soil impoundment was flooded. Approximately 100 tons of gravel were placed in and around the trap to keep birds from becoming muddy and to increase the visibility of the bait. The trap was completed in mid-October and the impoundment was re-flooded. The trap was set 3 times and caught an average of 800 ducks per trial. Usually several ducks entered the trap as soon as bait was removed from the exterior funnels and then hundreds of ducks would decoy into the trap. Virtually all of the ducks trapped were mallards and black ducks. We banded and measured a sample of the ducks trapped for estimation of body condition (Table 1). Ducks were held from 6 to 12 hours to allow digestive tract contents to pass, but they were given water ad libitum. We had planned to sample the waterfowl population in the Muddy Creek Bay (MCB) area, where approximately 60% of the black duck population is counted. However, problems with legal baiting during waterfowl hunting season precluded our bait-trapping ducks in this period. We placed 3 swim-in-traps (3 m x 3 m) in MCB in mid-September and removed the traps on 5 October. Mallards and black ducks were observed in the general areas of the 3 traps on MCB, but no ducks were observed feeding on bait. Since this was during the pre-hunting season, ducks had unlimited access to the productive marshes of the MCB area. One of these 3 m x 3 m traps was again placed in MCB on 29 November. High winds and variable water levels hampered our duck-trapping ability. Thus, we placed the trap in the North marsh of the Winous Point Shooting Club on 17 December. Ducks were observed in the general vicinity of this trap, but no birds were trapped before the marshes froze on 23 December. Thus, no ducks were ever trapped in the MCB area.

Black ducks and mallards being herded from the trapping site into a holding pen. (SS)

A black duck being measured for overall length. (SS)

Researcher measuring tarsus length on a black duck. (SS)

Radio transmitters (AVM, backpack design with a mortality sensor) were placed on 24 immature female mallards and 7 immature female black ducks on 7 November. Six mallards and 25 immature female black ducks were fitted with radio transmitters and released on 1 December. A 5-cc blood sample was taken from birds that received radios. The blood sample will be used to test for lead exposure, blood parasites, and disease exposure through analysis at the National Wildlife Health Research Center in Madison, Wisconsin.

Gut samples were collected at hunter check stations to estimate body condition of hunter killed birds. A total of 59 gut samples 934 mallards, 23 black ducks, 2 hybrids) were collected at Magee Marsh check station, and 26 samples (16 mallard, 10 black duck) were collected at the Winous Point Shooting Club. Approximately 375 gut samples have been analyzed from 1989 and 1990. Whole birds were collected at Winous Point and on Ottawa NWR.

Ducks with radio transmitters were located systematically 1-2 times a day through December. Ducks consistently used Ottawa NWR, Cedar Point NWR, and the Magee Marsh Wildlife Area. Several radioed ducks dispersed from these wetlands and periodically used Muddy Creek Bay wetlands and Toussaint River wetlands. Field feeding was documented for both mallards and black ducks.

Most ducks left southwestern Lake Erie wetlands on 23-25 December when cold temperatures caused shallow wetlands to freeze. The remaining radioed ducks used open water areas in the Village pond, Castalia, Ohio, the Maumee River, and Ottawa NWR. Warm rains on 28-29 December dispersed the

ducks from these open water areas of concentration, and the few ducks relocated were found in flooded farm fields. No influx of birds that left the area was observed through 30 December, but flocks of birds flew in from the north, presumably from wetlands in Ontario and Michigan.

Ottawa WMS41 - "Feeder Use and Winter Movement of Wintering Passerine Populations on Ottawa NWR." Mark Shieldcastle, Ohio Dept. of Natural Resources Experiment Station. Objectives of this study are to document: (1) feeder use, (2) winter home range, and return by wintering birds. This study was begun in 1984.

Data on movement by major wintering feeder species continues to be analyzed. The lack of snowfall and moderate temperatures resulted in a reduction of feeder use by ground birds. The reduced winter band total was not indicative of bird numbers. Large flocks of tree sparrows were scattered throughout the marsh region. Ample natural food reduced their dependence on artificial feeders.

A total of 163 birds of 10 species were banded on seven sampling dates. Dominant species were the Tree Sparrow, American goldfinch, slate-colored junco, and the house finch. The first pine siskin captured in this project was banded at the Bodi feeder.

6. <u>Other</u>

Lake Erie Study - Identify all lands along and within ten miles of the U.S. Lake Erie shoreline (concentrating on the western basin including the Lake Erie Islands) having the potential to meet any of or more of the following criteria:

a. Wildlife habitat including wetlands and areas used by threatened and endangered species.

b. Public recreation areas capable of meeting the public recreational need. This should include hiking, swimming, wildlife observation, hunting, trapping, fishing, marina/boating and other related uses.

c. Environmental education areas capable of meeting the needs of the general public, primary and secondary schools, and other groups in environmental education related to the Lake Erie shoreline. This should include an assessment of the Stone Laboratory's current role and potential for expanded use as well as possible coordination with other State of Ohio facilities in the region.

d. Unique natural, historical, and scenic features of the shoreline.

Identify research needs required to address the following management concerns on land typical of the Lake Erie shoreline areas addressed in item above.

a. Fish and wildlife habitat management.

b. Flood and erosion impacts

c. Restoration of wildlife habitat.

d. Potential human impacts on lands identified in this study.

Identify the need for both new or expanded facilities to include:

a. Federal fish hatchery or federal research station related to Lake Erie's fish, wildlife, wetland resources, and water quality.

b. University-based freshwater research consortium particularly expanding the involvement of the lake-front universities such as the University of Toledo.

c. Public environmental educational facilities

d. Federal research role

E. ADMINISTRATION

1. Personnel

Charles W. Blair - GS-12, PFT ..... Refuge Manager

Stanley S. Cornelius - GS-11, PFT ..... Primary Assistant Refuge Manager

Sandra M. Siekaniec - GS-7, PFT ..... Assistant Refuge Manager

Marjorie L. Miller - GS-6, PFT ..... Administrative Technician

Charles Marshall - GS-9, PFT ..... Outdoor Rec. Planner

David L. Day - WG-8, PFT ..... Equipment Operator

Robert Reynolds - WG-8, PFT ..... Maintenance Worker

Thomas A. Siekaniec - GS-5, TFT ..... Biological Technician

Jeff Nagel - GS-4, TFT ..... Biological Technician

Joseph Robb - GS-7, P Int. ..... Assistant Refuge Manager

Ottawa Refuge Staff (left to right)
Front row: Cornelius, S. Siekaniec, Marshall, Blair
Back row: T. Siekaniec, Miller, Day, Reynolds

Jeff Nagel, Biological Technician, on tern project.

Volunteer, Sandra Woosley helping to clear tern island.

Volunteer, Greg Clark, working on tern island.

Joe Robb, disking moist soil unit.

TABLE 4 Five-Year Staffing Levels

	Full-Time	Part-Time	Temporary	FTE
FY 1983	6	1	1	7
FY 1984	6	1	4	7
FY 1985	6	0	2	7
FY 1986	6	0	2	7
FY 1987	6	1	2	7
FY 1988	7	0	1	7.2
FY 1989	7	0	2	7.9
FY 1990	7	0	2	7.9

2. Youth Programs

YCC

The Ottawa Refuge 1990 Youth Conservation Corps (YCC) camp began on June 25. A random drawing was conducted for selection of four enrollees. Recruitment was coordinated through local high school counselors. Applications were mailed to Oak Harbor, Fremont, Genoa and Clay High Schools. Response applications totalled 22 overall applicants for the final drawing selection. Male applicants totalled 16 and female 6. An effort was made to recruit minorities, however no minority was selected in the random drawing process. Applicants selected for this year's program were chosen from Oak Harbor, Ohio and Fremont, Ohio. The random drawing provided two males and two females. One originally selected applicant rejected the opportunity to participate allowing an alternate the choice to participate.

The camp closed on August 24, after a nine week work period. All four enrollees were terminated on this date. No crew leader was hired again this year. Camp supervision and work leadership was directed by refuge staff. This years YCC group worked out excellently and each enjoyed the summer experience.

Enrollees who were selected for the 1990 YCC camp included Trilby Ehemann, 18 years of age from Fremont, Paul Mueller 16 years of age from Fremont, Shelly Hill 15 years of age from Oak Harbor and Jeremy Durdel 15 years of age from Oak Harbor.

YCC (left to right) Mueller, Durdel, Ehemann and Hill TS

Work Accomplishments

Work projects totalled 17 coded activities and a paid holiday this year. Many of the projects are on-going so were resubmitted for approval. Projects included bird banding, boundary posting, parking and facility area mowing, maintenance facility cleaning, trail clearing and upgrading, exotic plant eradicating and dike seeding. An orientation was provided to the selected enrollees and their parents before start of camp. Enrollees and parents were given a complete introduction to the YCC program and an understanding of requirements for each enrollee.

Funding

Refuge staff paid hours were not charged to the YCC account yet were obligated to supervise the group. Enrollee paid hours for the 9 week camp totalled 1134.5 hours for four enrollees. Salary cost was $5,102.07. Other cost and materials totalled $1,783.45. Total camp cost for the year was $6,885.52. 1990 station allocation funds totalled $6,800. The refuge assumed the $85.52 over expenditure.

Environmental Education

Several environmental education field trips were taken to expose enrollees to other conservation programs. Enrollees visited five sites for field educational tours and discussions. Field trips were taken to Wildwood Metropark, Toledo Zoo, National Park Service Perry's Monument and Ohio State University Extension/Ohio Department of Natural Resources, Fish Hatchery Put-In-Bay, Ohio. E.E. input was provided by refuge staff in the field during enrollee work breaks. A field trip was taken to an eagle nest site to observe banding procedures conducted by state wildlife officials.

Safety

No serious incidents or lost time occurred during the 9 week camp. Only minor bruises, scratches and insect bites occurred. Two enrollees developed uncomfortable rashes from poison ivy that disappeared with continuous use of first aid creams. Two enrollees held CPR certification. Enrollees attended staff safety meetings as appropriate during the summer.

Summary

ORP Marshall coordinated, directed and supervised the 1990 YCC camp as outlined by the Project Leader. Marshall's effort and time was reflected in the enthusiasm and productivity of each enrollee. Some refuge interpretive programs were not conducted to compensate for Marshall's YCC responsibilities. It is recommended that future summer camps continue to be coordinated and directed by the outdoor recreation planner. However, a crew leader position should be considered with the number of enrollees increased from four to five.

4. Volunteer Program

The volunteer program continued to be quite successful in 1990 with **3,998** total hours donated by **422** individuals. This included six groups who volunteered for a total of 988 hours. Volunteers have provided the extra manpower to assist refuge staff perform work duties such as the tern project, goose neckband survey, bird census, purple loosestrife spraying, clerical work, interpretation, environmental education, photography, trail maintenance and general maintenance. The areas where most of the time was spent were population censuses, the tern project, and photography.

In 1990 a total of 13 new volunteers were added to the program. In January, Sandra Woosley, David Cremer and Edward Daniels helped with interpretive and carpentry projects through the month. In February two volunteers were added to the program, Chris Ashley and Harold Ashley of Oak Harbor.

College student Edward Daniel from the University of Toledo completed 100 hours of student field experience at Ottawa NWR. Edward was given the responsibility of completing a much needed library shelving and bibliography reference. He was exposed to staff management duties such as public use, biological and farm bill operations. Edward's work was a compliment to operations.

Volunteer Chris Ashley has contributed time to assist ORP Marshall in tidying a storage cabin at Butternut Lodge to be used for group presentations and teacher workshop activities. The headquarters is inadequate in seating space for large group activities. Cabin rehabilitation adjustments will temporarily provide needed seating space for visitors.

A public evening Owl Hoot was conducted on Sunday, March 11 at 6:00 PM. A general slide program was given by ORP Marshall. Volunteer Mike Crofts discussed owl species indigenous to the area. Other volunteers assisted with the owl hoot guided walk. Approximately 20 visitors and volunteers attended.

A volunteer meeting was held on March 24 to acquaint the volunteers with some new changes and discuss any items of which they had concerns. It was a well attended meeting with 14 volunteers and 3 staff members in attendance.

Greg Clark, a high school intern from St. John's high school assisted the refuge three weeks during the month of May. His primary responsibilities involved assistance to the tern project. He later returned to volunteer on his own.

In May a volunteer recognition cookout was held at Manager Blair's home for 11 volunteers. Staff and volunteer family members totalled approximately 35 who participated in the gala. Certificates and volunteer pins were awarded to attending volunteers.

A Lake Erie waterway cleanup was conducted in the area on June 2, 1990. Ottawa Refuge was included for the second year. Approximately 75 volunteers contributed efforts to clear litter and debris from the lake front dike area. A dump truck load was collected within a two-hour period. ORP Marshall coordinated the work activities and was assisted by Biological Aid Jeff Nagel and Volunteer Chris Ashley.

Volunteers help make life a little easier, and the refuge staff appreciated the contribution of each volunteer. They were especially helpful when part of the staff were gone on private wetland restorations.

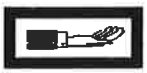
Ottawa's volunteers are treated special.

TABLE . 1990 Volunteer Hours

Volunteer	Hours	Volunteer	Hours	
John Arnold	54	Dan Lucas	29	
Chris Ashley *	116	Molly Maguire *	8	
Harold Ashley *	36	Kathy Mock	28	
Virginia Ashley *	17	Ray Patterson	3	
Greg Clark *	118	Ed Pierce	239	
Allen Cornelius	120	Jim Quinlivan	126	
David Cremer *	3	John Redman	19	
Chris Crofts *	114	Heather Romer*	14	
Mike Crofts	132	Susan Sargent *	39	
Scott Crofts	54	Al Schlecht	11	
Ed Daniel	100	Mark Shieldcastle	23	
Tina Easterday *	3	Jeff Stefanelli	180	
Andy Ellefson *	24	Pat Stewart *	29	
Jim Fueher	614	Art Weber	61	
Mary Gloer	50	Sandra Woosley *	102	
Al Kahl	60	Lori Zarefoss *	33	
Tom Kashmer	40	Boy Scouts (297)	816	
Joe Komorowski	108	Girl Scouts (16)	16	
Monthly Bird Walks	303	Lakefront Cleanup (75)	156	
TOTAL	2066		1932	**3,998 HOURS**

* New volunteers

Volunteers receiving their certificates. Front row (left to right): Scott Crofts, Al Schlecht. Middle row: Mike Crofts, Jim Fuehrer, Joe Komorowski, Virginia Ashley. Back row: Al Kahl, Ed Pierce, Chris Ashley, Chris Crofts, and Harold Ashley. (CM)



5. Funding

TABLE 6 Funding breakdown for the last five year fiscal period

	FY 86	FY 87	FY 88	FY 89	FY 90
Oper.&Maint..	200,300	254,800	264,000	343,300[1]	236,000
Core Maint.					87,372
ARMM's	95,200	62,800	26,200	0	0
Flex.Maint				20,000	26,500
Maint. Mgmt					98,300
Fire Mgmt					22,000
Threat/Conf.[2]	16,000	12,000	9,000		
Farm Bill				34,000	96,750
Special Proj.[3]					198,000
Totals	311,500	329,600	299,200	397,300	764,922

(1) Includes $25,000 for Permanent Change of Station Costs.
(2) Threats & Conflicts - Includes contaminants and purple loosestrife control.
(3) These are special funds for the study of Lake Erie Wetlands from a special congressional appropriation.

Core funding (1261 & 1262) actually increased very little this year (about 1.6%) and of course did not keep up with the inflation and salary increases. However, additional funding was received for support of the farm bill activities and for special maintenance items. Farm bill funds were adequate to rent, repair, and maintain the equipment used in the farm bill program without depleting refuge O&M funds. Farm bill funds were used for temporary salaries in farm bill activities; however, most permanent salaries were still funded by refuge O&M funds, even when working on farm bill activities.

Flexible maintenance and maintenance management funds were used for computer equipment, office furnace and roof rehabilitation, Pool 7 rip-rap, fuel tank removal, and purchase of a mower and pickup. Fire Funds were used for the purchase of a pickup, radios, and partial funding of an ATV unit.

Special project funds were allocated for the Lake Erie Shoreline Protection Study conducted at the request of Congresswoman Marcy Kaptur. The National Fisheries Center-Great Lakes was contracted to complete the study.

6. Safety

The refuge staff received a 1990 safety achievement award for overall accomplishment during the year.=The upcoming 1991 year safety achievement goal was blemished in September 1990 when two unfortunate field accidents occurred. One accident resulted in personal injury. Maintenance Worker, Robert Reynolds was injured in attempting to manually push an inoperable farm tractor. Reynolds slipped and fell into the path of the equipment being pushed by other staff. Reynold's foot and ankle were caught partially under the tire of the tractor causing a hairline fracture. Reynolds was out from work for 45 days not exceeding the continuation of pay period.

The second incident involved the heavy equipment operator Dave Day. Day was detailed to conduct farm bill duties offsite. He was moving equipment requiring unloading a dozer from a trailer. The dozer was moved and started backwards when moisture caused the tracks to slip sideways and roll over the edge. This caused the dozer to drop to the ground and roll on its side. Dave was wearing his seat belt and no injury or property damage occurred. The dozer was righted and work continued.

Follow-up Lyme disease testing was conducted in September and October for refuge staff by the Federal Employees Medical Health Care Unit in the Federal Building, Toledo, Ohio. All staff test results returned negative.

Safety committee members Cornelius, Day, S. Siekaniec and Marshall conducted monthly safety meetings in addition to Monday morning staff meeting safety reviews. Safety problems reviewed requiring attention and checks included fire extinguishers, smoke alarms, facility security alarms, vehicle road hazard items, public area safety, heavy equipment operations and station safety plan corrections.

Safety films and videos reviewed for the year are as follows:

- Safety on the Job, First Aid For Accidents
- Cold Water Survival
- Make Winter Driving Safer
- Welding: Physical Hazards
- Foot Safety
- Poisoning By Accident
- Air Bags

Safety Program Overview is as follows:

- Number of safety meetings held - 14
- Number of kinds of accidents for the year - 2
- Innovative safety ideas - 1

Station safety award.

7. Technical Assistance

Refuge Manager Blair and Assistant Refuge Manager Siekaniec met with Ohio Department of Natural Resources personnel Dennis Case, Gildo Tori, and Mark Shieldcastle on January 26 to discuss the Cooperative Agreements with the State of Ohio concerning the Heron study on West Sister NWR and the Common Tern reintroduction study on Ottawa NWR. Activities for the 1990 field season were the main items of concern.

Refuge Manager Blair, ARM Cornelius, and ARM Siekaniec met with Ohio Department of Natural Resources personnel from the Crane Creek Experimental Station on January 22 concerning the cooperative waterfowl hunting program on Ottawa NWR. The objective of the meeting was to evaluate ways to improve the quality of the hunt. We will attempt to modify our cooperative farming program to meet that end.

In February, the 1990 Water Management Plan was given to Davis Besse for the Navarre Marsh. A meeting with the facilities manager and the environmental compliance division was held to discuss the plan.

Refuge Manager Blair met with six private landowners during July to discuss the Service's Challenge Grant Program. All the individuals were interested in wetland restoration and improvement.

On July 18, Refuge Manager Blair met with a representative of the Maumee Bay State Park to discuss wetland restoration. A large restorable wetland is located on Park property and an effort is being made to encourage restoration. It is possible that the State may apply to the National Fish and Wildlife Foundation for help in accomplishing this project.

Refuge staff assisted in the Black Duck research project by building an island for the permanent duck trap in MS 5. The trap was completed by the researchers and baited by the end of October. Staff also assisted in banding and data collection activities.

Refuge Manager Blair attended a meeting of the Toledo Metropolitan Area Council of Governments (TMACOG) on October 5 concerning a wetland restoration project. TMACOG has received a grant form the Environmental Protection Agency to restore a wetland within the Maumee River watershed for pollution control and other associated wetland values.

A meeting was held with Davis-Besse staff and the trappers who will be trapping Navarre on November 26. The meeting went well and hopefully problems that occurred last year will be avoided.

One of the major projects in which the refuge staff was involved this year was the Lake Erie Shoreline Study. The study was funded by the efforts of Congresswoman Marcy Kaptur and went out for bid in June. The contract was awarded to the National Fisheries Center - Great Lakes located in Ann Arbor, Michigan. The total amount awarded for the study was $ 176,000.00 Assistance was given in this project by Refuge Manager Blair.

In February Refuge Manager Blair spent considerable time working on a "Request for Proposal" concerning the Lake Erie Shoreline Study. A second draft was completed and sent out for review on February 28. In April a "Request for Proposal" was finalized and provided to four Service offices for a response. The due date was set for May 15.

Refuge Manager Blair met with Doug Wilcox (National Fisheries Center-Great Lakes) and Dave Johnson (Ohio State University) on July 6 to discuss and review the Lake Erie Shoreline Study.

Refuge Manager Blair attended a news conference on September 21 with Congresswoman Marcy Kaptur. Congresswoman Kaptur announced the funding of the Lake Erie Shoreline Study in the amount of $198,000. She also stated that she is eagerly awaiting the results of the study so she can begin funding the project.

Another important work effort in 1990 was the Lake Erie Marshes Implementation Team (LEMIT) of which Refuge Manager Blair actively participated. The team was formed to implement the North American Waterfowl Management Plan, Lower Great Lakes/St. Lawrence Venture. The Lake Erie Marshes are a flagship project to the plan and are a high priority.

Refuge Manager Blair participated in the Lake Erie Marshes Joint Venture Steering Committee meeting held on February 1. A working group meeting is scheduled for March 31.

The Lake Erie Marshes Joint Venture made considerable progress in April with the formation of the implementation team. Two evening meetings were well attended and provided many suggestions and recommendations for improving the draft plan. Five meetings are scheduled for May. Refuge Manager Blair is co-coordinator of this effort.

The Lake Erie Marshes Joint Venture Implementation Team met on May 3, 16, and 31 of this month. The major focus at the present is to finalize the draft plan by July 1. The interest and participation of this joint venture continues to grow as the plan and team are developed.

Refuge Manager Charles Blair spent time on May 11 and 12 with the contractors developing the Lower Great Lakes/St. Lawrence Basin Joint Venture slide show. Information and a tour of the Refuge and surrounding area were provided.

Refuge Manager Blair participated in several meetings in June concerning the Lake Erie Marshes Joint Venture Project. Significant progress has been made toward finalizing the draft implementation plan.

Assistant Manager Siekaniec attended a public lands committee meeting for the Lake Erie Marshes Joint Venture on June 14. Many good ideas were brought up.

Refuge Manager Blair attended a North American Waterfowl Management meeting on the evening of August 9. Lake Erie Marshes Joint Venture activities were the topics of discussion.

The Lake Erie Marshes Implementation Team (North American Waterfowl Management Plan) met on September 27 at the Crane Creek Wildlife Experiment Station in Oak Harbor, Ohio. John Beall, Regional Representative of Pheasants Forever spoke about that organization and it's role in wetland preservation

and restoration. Other business included an update on the Lake Erie Marshes Plan, U.S. Fish and Wildlife Service Challenge Grants, and funding under the Wetland Conservation Act.

Refuge Manager Blair conducted a Lake Erie Marshes Implementation Team Meeting (NAWMP) on October 25.

8. Other Items

Regional Office personnel Rick Schultz and Steve Kufrin visited the refuge and the surrounding area on January 9 during a Farm Bill evaluation.

Engineering Inspector Tom Olsen visited the refuge during the week of January 22. Tom checked on the program of all ongoing flood damage construction projects and updated us on plans for the coming months.

Matt Kershbaum (WAM 2) visited the refuge two times during the year. On January 17 and 18 he participated in the farm bill evaluation and discussed refuge operations with Refuge Manager Blair. During December 18 and 19 he visited with staff. A meeting was held with the entire staff to talk about regional activities and discuss concerns of the staff.

Bill Hutchinson, Assistant Wildlife Associate Manager 2, visited the refuge on April 30. Bill got a first hand look at our refuge operations and also spent a day on our private lands effort with a trip to Lenawee County, Michigan.

Jim Mattssen, Regional Biologist, visited the refuge on November 13 and 14. He assisted staff in reviewing and advising on the wetland management for an upcoming plan. The refuge staff found his comments helpful in preparing and focussing on the overall management for the writing of the plan.

Regional Engineer John Ramsour visited the refuge on October 17 and 18 to inspect construction projects and assist the State of Ohio in designing the Pickerel Creek Wetland Restoration Project.

F. HABITAT MANAGEMENT

1. General

Habitat at Ottawa National Wildlife Refuge consists of a variety of wetland types (65%), grasslands (20%), croplands (8%), forest and brush land (4%), and dikes and roads (3%). Marshes are managed to provide year-around food, cover and nesting habitat for waterfowl and other migratory water birds. Moist soil and cropland units provide food for migrating waterfowl and grassland units provide nesting cover for waterfowl and other migratory and resident species.

2. Wetlands

Ottawa Refuge contains approximately 3,500 acres of marsh and 800 acres of moist soil areas which are managed for a wide range of food, cover, and nesting needs.

Moist Soil Units are managed to provide annual early successional mud flat species, such as smartweed, wild millet, etc. Annual drawdowns cause the unit to progress through a series of successional stages from the early smartweed/millet stage through the beggarstick/perennial stage, to the woody growth or cattail stage. The early stages are the most productive and can only be maintained by tillage of the soil or by a period of flooding for 1-2 years.

In 1989, many areas were in drawdown to facilitate renovation of damaged dikes, water control structures (WCS) and pump stations. Lake water levels were normal for the spring, but during the fall, water levels dropped making it difficult to manipulate the water.

An undesirable aspect of the construction and drawdowns is the expansion of the purple loosestrife infestation that we are already having difficulty controlling. The lower water levels this year facilitated its spread in several units (especially the Pheasant Farm). Private wetlands and state park lands adjacent to the refuge are heavily infested and provide a constant source of reinfestation even when control actions are effective in removing adult plants. Overall, the refuge is slowly losing the battle. All major divisions of the refuge are at least slightly infested. Control expenditures at the level of the past few years is slowing the spread and stopping a rapid takeover.

Another aggressive aquatic plant of concern is Phragmites. Phragmites started out in several units as small clumps, but has steadily increased the acreage it dominates. If it continues to expand at this rate, it may become a serious problem in Cedar Point - Pool 2 and the Show Pool. An aggressive control program was initiated in 1989. Many plants were sprayed with Rodeo in conjunction with purple loosestrife spraying.

Ottawa Wetland Units

Pool 1

Water levels were at a shallow marsh level through out the spring. The unit had an open water area in the middle and moist soil area in the northern section. Construction on this pool was in August of 1989. Gates were opened to refill the pool. It was refilled by gravity slowly and lost some water to evaporation during the summer. No costs were incurred as only gravity was used to fill the pool.

Submergent aquatics began to grow in the areas where water was standing. Other areas were covered with smartweed, where soil was disturbed due to the construction of the dikes. These conditions attracted shorebirds, geese and ducks. Approximately ten Purple loosestrife plants were found in the southern end and were sprayed with Rodeo from the airboat. The 6 - 12 inches of water in bay areas attracted average numbers of migrating waterfowl in the fall.

Pool 2A

Water levels were slightly above planned levels during the spring and below planned levels during the fall. Water levels in this pool are difficult to control as it only has one culvert which empties into an adjoining pool.

The pool did not hold a lot of attraction to wildlife during the year. A few smart weed plants were observed in the pool along with willow and cottonwood growth. The island in the middle of the pool is over grown with willow and cottonwood as well. Geese and a few ducks were observed loafing in the pool.

The dikes were mowed once and the roads were graded. Purple loosestrife was not observed in this pool this year.

Pool 2B

This pool was at a shallow marsh stage during the year. Water levels were slightly above planned levels in the spring and a natural depletion of water occurred in the summer due to evaporation. Excellent stands of smartweed developed in the pool. One clump of cattail was evident. Submerged aquatics continued to develop in the entire pool. Cottonwood seedlings continue to grow especially at the east end of the pool.

The dikes were mowed once and the roads were graded. Several of the dikes were seeded to grasses.

Pool 2C

Water levels were allowed to fluctuate between 69.5 and 70.8. In October water levels dropped providing mud flats for migrating shorebirds and waterfowl. Water was added in November during the latter part of the fall migration.

This pool had a variety of emergents, moist soil plants and a few submergents. Lotus continues to encroach into the middle of the pool. This was a favorite area for shorebirds and waterfowl during the fall due to exposed mud flats.

The dikes were mowed once and the roads were graded.

Pool 3

Water levels are now maintainable after construction was completed in August 1989. Water levels dropped during the summer due to high evaporation and transpiration factors. In August and September the pool had only a few inches of water through out. In October the new water control structure was set to fill the pool. By December the pool had an additional 1 - 2 feet of water. A water gauge is located in the southeast corner by the eagles nest but due to construction it is leaning and may not be accurate.

The east end of the pool was used heavily by geese, and ducks during fall migration as a loafing area. After the pool was flooded in the fall the waterfowl started using the western portion of the pool. The west end of the unit is still choked with cattail and brush.

Pool 6 (Woodies Roost)

The pool fluctuated along with the lake levels and evaporation rates. East and south dikes are no longer capable of retaining water. Both dikes are severely eroded in areas and are riddled with muskrat/woodchuck holes. The north half of the east dike is overgrown with sumac and dogwood and is barely wide enough to ride an ATV on. The north dike also has some erosion and muskrat hole problems. This unit is a high priority for the next dike rehabilitation.

Areas of dense cattail are still present. Area has limited use by geese, ducks, and herons. Muskrat dike damage continues to be a problem.

Pool 9

The pool was filled with water by gravity after the construction was completed. In the fall the pool was dewatered for the state to mow cattail on the east side of the unit and to allow access to install hunting blinds. The pool was then filled by gravity.

An area of dense cattail was mowed by the state. They also tried to seed the area for hunting but were unsuccessful. Cattail is still dense in other areas with patches of Phragmites. The back section of the pool has a large patch of Purple Loosestrife which was sprayed by helicopter this year. The area has limited use by geese, ducks, and herons. Muskrat dike damage continues to be a problem.

Entrance Pool (Headquarter's Pool)

Water was kept at a shallow to deep marsh level. Some water was lost through evaporation during the summer. The north dike is in perfect shape after completion of the construction. A water level gauge was installed in the spring.

Young cattail began to grow in the pool. The pool was used extensively by ducks in the spring and fall and by pied-billed grebes during the spring, summer and fall. Up to 13 young pied-bills were seen in the pool. Willow and cottonwood began to be stressed by the high water. In late July the willow, cottonwood and some Purple Loosestrife were sprayed by helicopter. Loosestrife was mostly found in the southeast section of the pool.

Show Pool

Water levels slowly decreased through out the year. In the summer it was due to evaporation. There is a slow leak in the south dike.

This pool has an island/remnant dike in the middle which most times is a moist meadow. The open water areas are devoid of any vegetative growth. Cattail, and Phragmites predominate with sections of loosestrife. Some smartweed grows amongst the cattail. Limited use by ducks, geese and great blue herons occurred.

Fifty gallons of Rodeo solution were used on loosestrife throughout the pool by helicopter and airboat.

Mini Marsh

Construction of the pump station was completed in 1989. Water was added to the unit after the dikes were completed in 1990 (mid-year). Water levels remained high especially during heavy flooding. Cattails dominated the pool along with open water after the pool was reflooded. A water level gauge is not present in this pool, as a result no water levels were taken.

Moist Soil Units

The main pump which manipulates MSU 3, 4, and 5 was operated in the spring and fall. Cost for running the pump was $ 3,876.07. The main ditch which leads from the pump to Crane Creek was rehabilitated this year.

MSU 3

Water levels were kept very low in this pool due to construction on the west dike. Most of the unit had no water through out the growing season. Low water levels encouraged upland species including willow, cottonwood, etc. Some millet was present along the northern dike but in limited quantity. Lack of water in the spring, summer and fall decrease duck and goose use on the area. The unit was reflooded in November and December and attracted large numbers of waterfowl. Total cost for pumping was approximately $ 646.01.

Refuge staff continued to work on the west dike. The north portion of the dike was bulldozed to strengthen it, but more fill must be placed and sloping and rip rap done to finish it. The dike was also seeded to upland grasses in the fall

MSU 4

This unit was rehabilitated in 1990. The unit was plowed then disked. Half of the unit was planted to millet and buckwheat near the end of July. The remainder of the unit was planted to winter wheat in August. Both the millet and buckwheat produced seed. Goose use was high in this unit during the fall. In November water was added to the unit, and both geese and ducks utilized it immediately.

Electricity to run the moist soil pump cost approximately $ 1,292.02. A portable pump was also used to lower the water level. Costs were also incurred during the disking and planting of the unit by refuge staff. The unit was plowed and disked by a cooperative farmer.

Flowering buckwheat with contrasting rows of millet planted in MSU 4. (SS)

Waterfowl use of planted wheat in the northern section of MSU 4 (buckwheat flowering in the background) (SS)

MSU 5

This unit was kept fairly high throughout the spring and summer to stress the willow and cottonwood. In August additional water was added to further stress the vegetation. Late September the unit was drawn down to facilitate the building of an island for a permanent duck trap. Refuge staff assisted the Black duck researchers in completing this project. At this time the western section was mowed of willow where conditions would allow. The unit was not dry enough to completely mow the unit. In late October water was added to the unit. Waterfowl use increased dramatically at this time. At the end of the year the pool was left high to stress willow and assist in mallard and black duck trapping. A small area of millet was growing in the northwest corner of the unit. Also an increase in cattail was noticed.

MSU 6

The unit fluctuated with the lake through breached dikes until August. In August there was some additional time to use on the rented dozer so staff assisted in rebuilding the north dike. In September a southern portion of the dike was rebuilt completely rehabilitating the unit. The unit was then pumped up with a crystafoli pump in October. Cattail is dominant with willow, cottonwood and Phragmites expanding into the area. Great blue herons and deer were the only species seen using the area.

MSU 7A

Water levels were kept low to facilitate the completion of the north dike. The eastern half of the unit was plowed, disked and planted with a combination of millet/buckwheat and wheat. This was done to set back the succession and regain a moist soil unit. The millet/buckwheat provided competition for other weed species but did not produce seed to any great extent. Wheat provided grazing for geese and was utilized. Limited waterfowl use occurred due to a lack of water.

The north dike was reconstructed in 1990. A new pump station was installed in 1989. Electricity for pumping cost $ 635.13. Costs were also incurred in the planting of the field by the staff. The unit was plowed and disked by a cooperative farmer.

MSU 7B

Water levels were kept low to allow rehabilitation of the north dike. The northwest half of the unit was planted to millet/buckwheat to set back succession. The other half was planted to wheat and mixed grasses on the far southeast corner. Some natural smartweeed growth also occurred in the far northwest corner. Some goose use of the area occurred during the seedling stages. Shorebirds also utilized the area.

The north dike was reconstructed in 1990 and a water control gate was placed in the northwest corner. All water for this unit will now come from MSU 7A with its pump. A water gauge is needed in this unit to correctly manage it.

Costs were incurred during planting of the unit by refuge staff. The unit was plowed and disked by a cooperative farmer.

MSU 8A

Average water levels occurred during most of the year. In August the water level was dropped to assist in carp control. Upland species occurred on the southern section of the pool. After the late drawdown, smartweed and millet began to occur on the mudflats. Waterfowl and shorebirds used this area to some extent in the fall.

Great egrets using the mudflats in MSU 8a in late summer. (CM)

A pump station was constructed in the south west corner of the unit in 1989. The pump was used for a period of time then difficulties began. It was down for most of the year. A crack was also repaired in one of the walls of the pump station in 1990. Electricity costs for the unit in 1990 were $455.07.

MSU 8B

Water levels were kept high until May when levels were gradually drawn down. The pool was in moist soil conditions from June through August. Water was gradually added to the unit in August. The water levels encouraged concentrations of millet and emergents (rushes). This unit had large numbers of ducks, geese, coots, great blue herons and great egrets.

Minor erosion is a problem along the north dike. The unit should not be held high or the north and west dikes will erode unnecessarily. The pump station, which pumps water in and out of an adjacent ditch to the south, was completed in 1989. In 1990 the old culvert on the south dike was removed due to muskrat activity. It was filled in. Then another culvert was placed to the west of the old one.

The electricity for the pump was $ 379.16 which included draining of the woods to the west and the surrounding ditches as well as the pumping of Unit 8b. A new culvert and dirt work were completed on the south dike. The dikes were mowed once during the year.

Cedar Point - Pool 1

Water levels were gradually increased throughout the year. Evaporation of the unit occurred in the summer and the pumps could not keep up with it. Many areas continued to developed dense stands of Walter's millet, smartweed and nutsedge. Small patches of wild rice were also found in the unit. Cattail continues to be the predominate vegetation. Loosestrife and Phragmites seem to have remained constant. Submergent vegetation began to grow in the deeper pools in the unit.

A new pump structure was installed in Pool 1 by early 1990. The pump structure costs were covered by the Cedar Point Pump Structure contract. All the dikes were mowed once. Early blooming loosestrife was hand pulled by YCC and staff then burned. Rodeo was aerially sprayed on 30 acres of loosestrife (300 gallons of a 5% solution). Approximately 7 acres were treated by airboat (35 gallons of a 1% solution). Electricity costs for the pump were $ 9,493.16.

Cedar Point - Pool 2

The main water control structure has been silted in for years. Pool 2 water levels are directly connected with Pool 1 through the interconnecting water control structure, and this is the only way of regulating water in Pool 2. In the late summer ditches were cleared to maintain the connection. Water levels remained moderate to low.

Cottonwood seedlings, Phragmites, Purple loosestrife and cattail dominate this pool. The area should be burned next year. Very little waterfowl use occurred in this pool.

Cedar Point - Pheasant Farm

Water levels were moderate at the beginning of the year. Summer evaporation reduced the level considerably. Additional water was added late in the year.

Purple Loosestrife continues to be a problem in this pool. Little duck use was observed in the area. The entire pool is dominated by loosestrife and cattail. A small number of waterfowl utilized this pool.

The dikes of this unit are in poor condition. Banks of the west and east dikes are severely eroded. The south and north dikes are eroded on the interior side only. The current gauge in the pool is located in an isolated borrow area where accurate measurement is not possible. A new gauge should be placed in the pool or the old one should be relocated.

Darby - Pool 1

Water levels were low in the spring to moderate towards fall. Water not choked with spadderdock, pickerel weed or lotus was full of submerged aquatics (canals and east end). Rose mallow, purple

loosestrife, and Phragmites continued to be a problem in the unit. Waterfowl use (Wood ducks especially) was steady throughout the year. All dikes were mowed once in 1990. Water was added to the pool by gravity only.

Darby - Pool 2

Water levels were fairly stable varying from 72.0 to 73.5. Purple loosestrife infestation remained stable despite efforts to control it. Cattail and submergents remain the dominant species. Large numbers of pintails were observed in this pool in the spring.

A new water level gauge was surveyed and placed on the water control structure during the year. Dikes were mowed once. Construction on dikes and pump station, which will aid in water manipulation in Pools 1, 2, 3, and 4, was completed in late 1990. The pump in the ditch was used to dewater the ditch for construction purposes, add water to Pool 2 and 3, and dewater Pool 4 when flooding became a problem. Total costs for the Darby pump were $ 1334.58. Each unit utilized approximately one quarter of the cost.

Darby - Pool 3

Water levels were low early in the year. In midsummer water levels increased. A decrease in water levels occurred in October/November during the lowering of pool 4. A water level gauge was surveyed and placed on the water control structure during 1990.

Cattail and pickerel weed dominated the unit. Loosestrife is intermixed with cattail in the south section of the unit. Waterfowl use of the area was very limited.

Darby - Pool 4

The pool water levels were low to moderate through out the year. Water levels increased during fall flooding and water levels were dropped to assist adjacent land owners. Most of the pool was water covered. Submergents were prevalent throughout the pool. The pool edges developed stands of cattail and willow/cottonwood. The area was used mostly by dabbling ducks unlike past years when divers were more common. A new water control structure was placed on the west dike in 1989 and completely functional in 1990. All dikes were mowed once.

Navarre - Pool 1

Water levels generally followed the water management plan for the year. Cattail, emergent and submergents dominated the unit. Waterfowl use was average but not great. The reduction in numbers could be due to an increase in vegetation to hide in.

All facilities are maintained by Davis Besse staff. Brush encroachment on the dikes is making censusing difficult as well as damaging the dikes. All pumping costs were paid by Toledo Edison.

Navarre - Pool 2

Water levels generally followed the planned water levels. Cattail and river bulrush dominated the unit. Other higher areas had good growth of submergents and emergents. The section towards the back gate had good stands of smartweed. Southern portions were wet meadow habitat.

All facilities are maintained by Davis Besse staff. Brush encroachment on the dikes is making censusing difficult as well as damaging the dikes. The staff gauge was surveyed and seemed to be off (as compared to the bench mark). All pumping costs were covered by Toledo Edison.

Navarre - Pool 3

Water levels were maintained well below the planned levels. Base information needs to be gathered. The unit needs to be measured to determine depths at certain gauge readings.

Cattail is the dominate species in this unit. Muskrat are using the area extensively. Many Coots used the pool for nesting. Other waterfowl noted in the area were few.

All facilities are maintained by Davis Besse staff. Brush encroachment on the dikes is making censusing difficult as well as damaging the dikes. Flap gates were installed by Davis Besse staff on the outer dike near the mouth of the river. A staff gauge was surveyed and placed near the pump station by refuge staff. All pumping costs and the flap gate costs were covered by Toledo Edison. No purple loosestrife was observed.

3. Forests

There are four major woodlots on Ottawa. One is an area surrounding the shop, a woodlot to the south of MS 8b, a woodlot to the west of 8b, and a woodlot west of Butternut Lodge. Dikes along Crane Creek also have large tree species.

Gypsy moth traps were place in all the major woodlots in June. They were then removed and checked in August. The number of moths collected this year were 30. This was a decrease from 36 moths captured in 1989.

4. Croplands

Ottawa's cropland program is administered primarily to support the refuge hunting program in providing a quality goose hunt and to support the management of our moist soil program by providing some periodic tillage in these areas.

TABLE 7. Crops Planted by Farm Unit - 1990

Crop	Unit 1	Unit 2	Unit 9	Unit 10	Unit 11	MS-4	MS-7	Total
REFUGE CROPS								
Corn	4	7	3	3				17
Sorghum								
Wheat		7		12	25*	60	25	129
Buckwheat/Millet						20	25	45
COOPERATOR'S CROPS								
Corn	9	30						39
Soybeans	10	49	40	56	60			215
TOTAL	23	93	43	71	60*	80	50	420*

* - 25 acres of soybeans were overseeded with wheat

Refuge crops, unlike the two previous year, did extremely well with the exception of some early planted corn. Rainfall was good and received at the right times. Some corn in units 9,10, and 11 were planted early and cool wet weather during early May caused the seed to rot in the ground. These fields were replanted to soybeans in June.

Moist Soil Units 4, 7A, and 7B were plowed and disked by farm cooperators and refuge personnel drilled the units to wheat (80 acres) and a combination of buckwheat/Japanese millet (45 acres in 12 foot strips). Goose use on these areas was excellent during the fall months.

Approximately 25 acres of soybeans in unit 11 were aerially seeded to wheat approximately 30-60 days before harvest (before the soybean leaf drop). This produced good green browse after the soybeans were harvested and hopefully will produce a wheat crop for next year.

A 6 acre field of 1989 fall planted wheat was left to mature and was not harvested but rather disked up in late August to create a good green browse stand of volunteer wheat.

5. Grasslands

The Switchgrass fields in Units 8, 9, 10, and 11 produced good seed heads. The fields were harvested in October by a cooperative farming agreement. Calvin Ernst from Meadville, Pennsylvania harvested the seed and is currently processing the seed. Once the processing is completed we will receive 40% of the crop. These fields are in need of prescribed burning to regenerate the units. This prescribed burning has been delayed due to lack staff training and the necessary fire and prescribed burning plans which we simply have not had time to work on because of farm bill and other activities of higher priority.

Moist Soil Unit 7b was seeded to native grass seed on the southeast corner of the unit in the fall. It is hoped that this will provide cover for nesting ducks and pheasants while still being able to flood the lower northwest corner of the unit.

9. Fire Management

Several of our grassland fields are in need of prescribed burning. Unfortunately, the manpower necessary for the writing of the required fire control and prescribed burning plans have not been available, and this management tool is simply not an option to us until these plans can be completed. Also the staff is in need of updated training and equipment.

10. Pest Control

A. Purple Loosestrife

This year the struggle to contain and eliminate purple loosestrife was made easier by aerial applications. In many areas of the refuge purple loosestrife is growing in such large monocultures that aerial application is the most effective method of control. The Ohio Department of Natural Resources provided the helicopter and manpower while we provided the chemical Rodeo. A total of 1113 gallons of 5% solution which covered 112 acres were sprayed by helicopter while 83 acres were sprayed by hand (521 gallons of a 1% solution). Early bloom of loosestrife occurred in early July. Many plants were pulled by hand to eliminate spraying more than once in each area. YCC enrollees assisted refuge staff in pulling the plants and transporting them. The plants were then piled and burned.

Purple loosestrife before spraying in Pool 1 Cedar Point . . .

. . . and five days after spraying. (SS)

Cedar Point Control Efforts

All construction at Cedar Point was completed thus allowing the pools to be filled with water. This made it easier to use the airboat in locating loosestrife. In Pool 1 a total of 30 acres were treated by helicopter while 7 acres were treated by the airboat spray rig. Pool 2 had a 2.5 acre area treated by helicopter. The Pheasant Farm was also treated by helicopter (5 acres).

Areas which were heavily infested included Pheasant Farm where much of the cattail and surrounding areas are covered with loosestrife. Pool 1 has areas along the major interior ditches, along the tip of the point, along the dikes, and areas in the northwest section of the pool. The major concentration in Pool 2 is located to the east of the Toledo Water Intake building on the east of the woods.

This aerial photograph of Cedar Point Pool 1 (looking towards the northwest) shows á mosaic of purple and green. (SS)

Darby Control Efforts

In Pool 1, 5 acres were sprayed by helicopter. In Pool 2, 1 acre was sprayed by helicopter while 30 acres were treated by airboat. In Pool 3, 1.5 acres were sprayed by helicopter. Approximately 4 acres were sprayed by helicopter in Pool 4, and 7 acres were sprayed by using the ATV.

Pool 1 has several patches of loosestrife in the middle of the pool where the open water becomes cattail and along the interior ditches in the pool. Pool 2 has a few small patches along the ditches and between the southern road and the dike. Pool 3 has several patches to the north side of the south dike (prior to the borrow area). These areas are interspersed with cattail and are difficult to see. Pool 4 has several areas on the southwest corner along the road and on the southeast corner where the cattail meets the woods. There are also some areas to the west of the borrow pit and the road amongst the trees and brush.

Ottawa Control Efforts

Various areas on Ottawa were sprayed. Although Ottawa is not as bad as Cedar Point there are a few areas that are problems. There is an area to the north of Pool 9 that is very unaccessible which is seriously infested with Purple Loosestrife. This area is best reached by helicopter. Five acres were sprayed by helicopter at each of the following areas; Show Pool, and Pool 9/Pool 3. Areas sprayed by the ATV included: MS 8b (7 plants, .2 acres), Krause road fields (10 plants, .55 acres), and Goose Pen (.6 acres). Other areas were sprayed by truck with the 50 gallon spray tank and by backpack sprayers (Pool 3 - 17.4 acres). The Show Pool (2 acres) and Goose Pen (10 acres) were sprayed by backpacks only.

A few plants are located in MS 8b in the northeast corner. One large plant was located in the field on the north side of Krause Road across from the lodge.

Navarre Control Efforts

All of Navarre control efforts are undertaken by the Environmental Compliance Division at Davis-Besse Nuclear Power Plant. This year only two plants were sprayed inside Navarre while approximately 30 plants were sprayed in an adjacent landowner's marsh. The staff used approximately 3 gallons of solution. Due to intensive efforts by Davis-Besse staff purple loosestrife is under control in the marsh.

B. Phragmites

Several areas have developed dense stands of Phragmites. These areas were sprayed with Rodeo during the purple loosestrife control efforts. Areas which were infested on Ottawa were Pool 3, Pool 8, Pool 9, MS 4 and Cedar Point - Pool 2. Some of the old farm units in Woodies Roost are also developing stands of Phragmites. Approximately 142 gallons of Rodeo solution (1%) was applied.

12. Wilderness Areas

West Sister Island NWR is a wilderness island located 9 miles off the shore of Lake Erie. This island was visited several times by researchers during the summer. For more information about West Sister Island see the separate section on the area at the back of the narrative.

15. Private Wetland Restoration (Farm Bill Activities)

During the 1990 field season refuge staff were again involved with Wetland Restoration efforts. Working in a total of 3 states and 8 counties we were able to restore a number of wetlands.

When the dust finally settled and winter rains began to fill most basins, we had restored a total of 72 wetlands for a total of 262 acres. This includes 2 FmHA restorations located in Lenawee County, MI.

With the increasing number of restorations each year our Management District must also deal with the occasional problem such as rebuilding a dike, searching for additional tile or correcting adverse water effects on adjoining land owner's property. These are all time consuming events.

During the 1990 field season we revisited 12 such sites to get them functioning again.

TABLE 8. MICHIGAN WETLAND RESTORATIONS - LENAWEE COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	1989	1990
Bayer, Andrew	Y		1			2.0	
Blake, David	N		1			2.5	
Buggerman, Dan	Y			3			4.0
Cady, Carl	Y	2			6.5		
Comfort, Gorden	Y			1			3.0
Crane, Martha	Y			1			2.0
Daub, Gorden	N	2		1	6.0		2.0
Fisher, Bruce	N		2			13.0	
Greggory, Amos	Y			3			5.0
Hassenzahl, Joel	N		3			3.0	
Jones, Kent	N		4			6.0	
Marcoux, Otto	Y			3			6.0
Nickloy, Keith	N	1			6.0		
Ramsdell, Estate	Y			9			14.0
Reeder, Jack	N			1			4.0
Ryan, Rial	FmHA			2			7.0
Sallows, Vera	Y	2		4	3.0		6.0
Schafer, Melvin	Y		2			6.0	
Schultz, Marion	Y			7			22.0
Shepherd, Dave	Y	2			6.0		
Steve, Elmer	Y	3	1		5.0	15.0	
Wiebbler, Larry	Y			1			1.25
Wood, Audrey	Y		1			1.5	
Worker, Ken	Y			4			4.0
Young, Doug	Y	1			1.0		
	TOTAL	13	15	40	33.5	49.0	80.25

TABLE 9. INDIANA WETLAND RESTORATIONS - STEUBEN COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	1989	1990
Bidwell/Hall	Y	1			5.0		
Brooks, Richard	Y	1			2.0		
Couch, William	N	1			5.0		
Dirrin, Ken	Y	3			8.0		
Greenamyer, John	N	1			3.0		
King, Steve	N		4			11.0	
Monaghan, Mike	N	1			2.0		
Presely, Claude	Y	1			3.0		
Ridenour, Roy	Y	2			4.5		
Smith, Elizabeth	Y	2			5.0		
Snyder/Griffen	Y		3			15.0	
Stegelman, Rudy	Y	2			8.0		
Stegelman, Rudy	Y		2			6.0	
Tritch, Richard	Y	1			5.0		
TOTAL		16	9		50.5	32.0	

TABLE 10. INDIANA WETLAND RESTORATIONS - DEKALB COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	ACRES 1989	ACRES 1990
Beaman, Jim	Y		10			20.8	
Brown, Dr. Leslie	Y	7			8.0		
Conrad, Ronald		1			1.0		
Fetters, Walter	Y	2			3.0		
Friend, John	N	1			2.0		
Fry	N			2			4.0
Hawver, John	Y	1			1.0		
McCrady, Don	Y	2	1		4.0	1.0	
Middaugh, Warren	Y	4			9.0		
Miller, Doug	N	1			0.3		
Palmer, Bruce	Y	4	1		2.3	2.0	
Pressler, Don	N	1			3.0		
RCTG Corp.	N			2			4.0
Smith, Richard	N	1			3.0		
VanHorn, Grant	Y	1			18.0		
Zollman, Steve	N	1			1.5		
TOTAL		27	12	4	56.0	23.8	8.0

TABLE 11. OHIO RESTORATIONS - HURON COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	ACRES 1989	ACRES 1990
Jones, Michael	N		1			1.0	
ODNR, Willard Marsh	N		1			2.0	
Parsons, Dan	Y		1			1.5	
Prater, Bayliss	Y		4	1		12.0	2.0
Sheldon, Dean	Y		3			7.0	
TOTAL		0	10	1	0.0	23.5	2.0

TABLE 12. OHIO RESTORATIONS - WILLIAMS COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	ACRES 1989	ACRES 1990
Bordner, Vincent	Y		2			12.0	
Clements, John	Y		4			12.0	
Lamar, Dick	Y		1			2.0	
Keller, Dan	Y			1			5.0
Lutz, Jim	Y		3			5.0	
Miler, Ruby	Y		4			5.0	
ODNR, La-Su-Ann	N		9	7		34.0	16.0
Oyer, Robert	Y		1			3.5	
Sullivan, Don	Y		2			4.0	
TOTAL		0	26	8	0.0	77.5	21.0

TABLE 13. OHIO RESTORATIONS - OTTAWA COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	ACRES 1989	ACRES 1990
Gaeth, Robert	Y		3				40.0
McRitchie, Park	N		2				10.0
TOTAL			5				50.0

TABLE 14. OHIO RESTORATIONS - HARDIN COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	ACRES 1989	ACRES 1990
Daugherty, John	N		3				4
TOTAL			3				4

TABLE 15. OHIO RESTORATIONS - WOOD COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	ACRES 1989	ACRES 1990
Pfeiffer, Elroy	Y		1				9
TOTAL			1				9

TABLE 16. OHIO RESTORATIONS - SANDUSKY COUNTY

NAME	CRP	1988 SITES	1989 SITES	1990 SITES	ACRES 1988	ACRES 1989	ACRES 1990
Daubble	N		2				60
ODNR, Pickerel Creek	N		1				6
Blue Heron Reserve	N		5				17
Olszewski, Tom	N		2				4
TOTAL			10				87

With restoration efforts beginning in early May, Ottawa crew started the season with the First Private Land Restoration done in Ottawa County. This landowner purchased control pipe and rip rap - FWS did construction. (TAS)

With help from an existing dike, we were able to restore this 4.5 acre basin with minimal effort. (TAS)

Once restored and filled, an adjacent land owner complained that this wetland was holding water back on his farm. After the water level was dropped approximately 2 feet the adjacent landowner found a plugged drainage ditch on his own field to be the problem. (TAS)

BEFORE

Just to the east of the previous wetland we were able to restore another wetland, again with help of an already existing dike. Finished size: 5.5 acres, Ottawa CO Ohio. (TAS)

AFTER

During the summer of 1990, Ottawa was able to restore their first FmHA basin shown here from the dike site. Lenawee CO MI. (TAS)

In the distance you can see the dozer working on the dike site with a heavy growth of cattail in the foreground. Lenawee CO MI. (TAS)

Six months after the dike was completed, there is a visible change with open water now being seen. (TAS)

A huge thank you is extended to all the operators who made 1990 another successful season. (TAS)

Dave Day - Ottawa NWR
Robert Reynolds - Ottawa NWR
John Allan - Clarence Cannon NWR
Lawrence Zellar - Seney NWR
Terry Papple - Seney NWR
Charlie Smith - Ninigret NWR

Crew and JD550 dozer from Seney NWR. (TAS)

Charlie Smith, Ninigret NWR. (TAS)

With above average rainfall the Ottawa restoration crew found itself working in wet conditions a number of times, especially on repairs. DeKalb CO, IN. (TAS)

Through farming, urbanization and industrialization, many of this areas wetlands have been drained. (TAS)

Once restored there is an immediate response from wildlife. Wetland pictured was restored in September, 1991 and filled with water by mid-November. Both areas are within 1-1/2 miles of the Ottawa NWR. (TAS)

G. WILDLIFE

1. Wildlife Diversity

The 8,315 acres of the refuge complex maintains a variety of habitat from croplands and grasslands to several types of wetlands. A wide range of species can be found on the refuge. Volunteers conduct bird species counts on all units once each month. ODNR flies refuge units every week for waterfowl census in the fall and winter. Refuge personnel conduct an on-land waterfowl population census biweekly, and weekly during spring and fall migrations.

2. Endangered and Threatened Species

A. Bald Eagles

A volunteer workshop on eagle monitoring was presented by the ODNR at Crane Creek on Saturday, February 24. An excellent presentation was given on eagle behavior and management. Volunteers are used to monitor all nests to determine start of nesting and hatch dates. This information is then used to pin point the best time for banding and installation of telemetry equipment to determine habitat use of the fledglings. Assistant Manager Siekaniec attended the presentation.

The complex has had two active bald eagle nests for the past several years, one at Ottawa NWR, and one at Cedar Point NWR.

Ottawa's nesting pair of bald eagles were actively incubating in March. The young were due to hatch on April 8. From observations that week it appeared that the hatch was successful. On that Thursday the adults began to leave the nest, and by Friday they had abandoned it all together. The nest was physically observed on Friday and only egg shell fragments were found in the nest. This is the third year this nest and pair have failed. Once again the question becomes contaminants.

The Cedar Point NWR pair was actively incubating in March, and the expected due date was April 14-19. Bad weather was the reason for the variance in the estimated hatch date for the Cedar Point NWR pair. The Cedar Point NWR pair hatched sometime during the week of April 16. Normal feeding behavior had been observed and adults are the most statuesque in the area. They rarely leave the area or move in the nest. During May the Cedar Point eagle's nest was still active although it was unknown the number of young in the nest. During banding efforts it was discovered that the Cedar Point eagle's nest had one female eaglet. The eaglet was banded on June 22. Blood samples and feathers were taken for a great lakes contaminant study. A radio transmitter and patagial tags were also placed on the young eagle for an ODNR study.

Cedar Point female eaglet complete with a radio transmitter and patagial tags with Ohio DNR staff. (MG)

Cedar Point eaglet after being placed back up in the nest. (TH)

The Cedar Point female was labeled 602. With the telemetry study we were able to track her movements. She hatched on April 16, and a radio was placed on June 22. She was at Cedar Point until August 7 and on August 17 and 27, no signal was found. On September 4 the bird was located in the vicinity of Pool 3. And periodically at Ottawa through October 15. On October 17 the bird was found at Cedar Point in the morning and at Ottawa later that day. The bird was periodically found at Ottawa until November 19 which was the last time the signal was heard.

The 1989 Cedar Point male (#238) which was last verified on October 23, 1989 was found at Ottawa from October 22 to October 26.

Indications from observations and the telemetry data show that the immatures in the western Lake Erie shoreline congregate at two locations during the fall. One location is near the mouth of Crane Creek and the other is in Sandusky Bay. Both of these areas are tributaries that are protected and have very little human disturbance.

On April 6 an immature bald eagle was returned to Ottawa after a year of rehabilitation at the Minneapolis Raptor Rehabilitation Center. The previously unbanded eagle had a bad wing fracture which had started to decay when he was picked up for rehabilitation. After a few attempts and crash landings he was reintroduced to the Ohio area by ODNR staff at Crane Creek State Wildlife Area adjacent to Ottawa NWR.

An eaglet chick which apparently died on hatching in April was sent to the National Wildlife Health Center, Madison, Wisconsin for evaluation. This chick came from a nest near the Sandusky Bay Bridge on US Route 2. The eagle's nest is located in a heron rookery adjacent to a four lane highway. This is the second time this nest has failed. From data collected in the area, it is believed that the Lake Erie eagles are successful during their beginning years of nesting and begin to fail as contaminants build up in the bird's system. Hopefully the evaluation of the chick will give more concrete answers.

Another immature bald eagle was picked up in Logan County on August 25. It appeared to be very tired and did not resist at all. It was taken to a rehabilitation center where it was fed and given liquids. Upon referencing the band number on the eagle, it was found to have hatched and banded in Superior National Forest, MN. It was then hacked in Georgia and a radio transmitter placed on it. The rehabilitation center brought the bird to us in good health, and it was released at Ottawa near the visitor parking lot.

A U.S. traveler released after a long journey and rehabilitation. (SS)

An adult bald eagle was picked up in Sandusky County on August 26. It was found near the state headquarters area of Pickerel Creek State Wildlife Area. The eagle had a maggot infested right wing which was found to have extensive tissue damage. Bruises and lacerations on the head and wing led veterinarians at the Raptor Center in Minnesota to believe it was hit by a moving vehicle. During x-rays no bones were broken but 6 pellets were found probably due to a previous encounter. The eagle was an adult female which had no bands of any kind.

In October bald eagle immatures from this year's nests were seen in the vicinity of Crane Creek. Up to 13 birds were seen at one time. By the end of the month only the wintering adults were observed in the area.

Two immature eagles perched in a tree above Crane Creek. (JF)

B. Peregrine Falcons

A peregrine falcon was observed in the area once in May at Ottawa and once in October at Navarre.

3. Waterfowl

A. Ducks

Total duck use for the complex was 2.77 million use days, a decrease of 8% from 1989 (3 million). Approximately 54% of the use occurred at Ottawa NWR with the remainder occurring at Cedar Point. Total use at Ottawa was 1.5 million use days as compared to 1.7 million in 1989, 2.25 million in 1988, 2.24 million in 1987 and 2.08 million in 1986.

Spring peak occurred in April at Ottawa (10,898) and at Cedar Point (35,464). Fall populations peaked at approximately 38,656 birds at Ottawa as compared to 34,400 in 1989, 54,000 in 1988 and 40,000 in 1987. Most was completed by spring migration, and all construction was completed by the fall migration. This could account for the increase in peak populations Cedar Point peaked at approximately 23,960 in November as compared to 15,500 birds in 1989, 82,000 in 1988 and 28,000 birds in 1987.

A large concentration of divers were observed at Cedar Point during the week of April 16. A survey conducted on April 20 estimated the population as 33,806 scaup plus other assorted divers. (CA)

A Wood Duck Box Challenge Grant Project was begun this year. Supplies were purchased in January. Twenty boxes were completed by the Northwood High School students in February. Locations for the boxes were evaluated. Then the boxes were installed in March and April. The airboat was helpful in installing and checking boxes along Crane Creek. A total of 20 boxes were installed at 3 locations - 7 along Crane Creek, 6 in MS8a, and 7 in Pool 3. During May, the boxes where checked for usage. Most of the nests contained young starlings; however, 4 of the 20 nests were used by ducks. Two female wood ducks and one female merganser were banded during this nest check.

B. Geese

Goose use for the complex was .8 million use days as compared to .76 million in 1989, 1.36 million in 1988, 2 million in 1987 and 1.55 million in 1986. This is well below the objective level of 1.5 million use days. Approximately 181,045 use days occurred at Cedar Point and 622,843 use days on Ottawa NWR. A slight change in goose use was observed at both Ottawa and Cedar Point as compared with 1989 when Cedar Point had 108,597 use days and Ottawa had 656,973. In 1988, 57,035 use days occurred at Cedar Point and 1.3 million at Ottawa. In 1987, 160,000 use days occurred at Cedar Point and 1.85 million at Ottawa.

Volunteer Mike Crofts assists in Wood Duck Box placement. (TS)

C. Swans

Refuge use by tundra (whistling) swans sharply increased this year. Peak usage occurred at Cedar Point in March with 311 and in November with 235 birds. The estimated use days for 1990 totalled 19,690. This is a definite increase as compared to 2,013 use days in 1989, 2,450 days in 1988, 7,200 use days in 1987, 14,000 use days in 1986. It almost reached the 1985 use days (28,000). Reports from the 1970's show hundreds of swans utilizing refuge units for an extended period. For the last few years, the swans have bypassed the refuge completely, or have stayed for only a few days in small numbers (2 - 30 birds).

Mute swans have been increasing in numbers with nesting attempts occurring at Navarre and Cedar Point. Total use days were 514 for Ottawa and 31 for Cedar Point. During a flyover in Cedar Point for loosestrife a single bird was observed sitting near a muskrat cabin with many white feathers (including primaries) on it. It appears that one bird was lost to unknown causes. The nest was located near Lamb's woods in Pool 1. The birds at Navarre are periodically checked to make sure that no young are hatched although an immature mute was seen at Navarre this year.

4. **Marsh and Water Birds**

Great blue herons, great egrets, and black-crowned night herons were abundant on the refuge throughout the spring, summer, and fall seasons. Ottawa and Cedar Point Refuges provide much of the feeding areas for the nesting colony on West Sister Island. The colony contains approximately 10,000 nests, and is the largest heron/egret colony on the Great Lakes chain. Studies have shown that these birds will fly 9 miles from the island to the main refuge complex several times a day to feed their young. Very heavy feeding occurs in the marshes, drawdown areas and mudflats created by Lake Erie wind tides. Species found less commonly in the area include snowy and cattle egrets and little blue and green herons. See research project WMS28 (section D-5)for more information on banding of the heron rookery at West Sister.

A pelican was observed on the refuge at Ottawa - Pool 4 during the end of July through the first part of August. It was a very rare occurrence for the area. (JN)

5. **Shorebirds, Gulls, Terns, and Allied Species**

A. Shorebirds/Gulls

Several shorebird species used mudflats along Crane Creek and in some of the interior pools throughout spring and fall. Ring-billed and herring gulls are common on the Lake Erie shoreline and nest on West Sister Island. Large numbers of Bonaparte's gulls were observed on the refuge during late fall. A few great black-backed gulls were sighted as well.

B. Common Terns

A few common terns and young forester terns with a group of ring-billed gulls. (JN)

Historically, common terns nested in several colonies around the island region in western Lake Erie and on mud islands dredged up in Maumee Bay near Toledo. In Maumee Bay alone, there were an estimated 2,500 pairs of nesting terns in the 1960's. By 1987, those numbers were reduced to a few unsuccessful nesting attempts, due partially to the direct competition with ringbill and herring gulls for nesting sites and food. Several thousand ring-billed and herring gulls now successfully nest at the Maumee Bay dredge site.

In 1987 the tern project was started in cooperation with the Ohio Department of Natural Resources (ODNR) and the U.S. Fish and Wildlife Service (FWS). The goal was to create a colony of nesting common terns at the Ottawa National Wildlife Refuge. Management techniques continued from previous years included a mylar tape grid on the island site to discourage gull use before the terns arrived, predator control, tern decoys, and daily observations. Taped calls and the electric fence enclosure were discontinued due to their ineffectiveness. The gull eradication procedure was altered to assess the potential of utilizing a few nesting Herring gulls to ward off non-breeding gulls from the site. This reduced human interference during the tern nesting.

In 1989 no terns were observed using the dike nesting site. However the island site was a success with a total of 26 nests were initiated this year with a total of 47 eggs. Four juvenile terns were banded. At least two terns are believed to have fledged.

At Ottawa the reflective tape has been used for several seasons to deter gulls from nesting and perching. The mylar tape was placed on the island in a 2 ft. by 2 ft. grid along the south eastern half of the island during March. The grid was then removed in May when the first tern was observed in the general vicinity. The mylar tape grid appeared to discourage the gulls from landing. No gulls were seen in the area with the mylar tape.

Mylar tape grids being placed on the island to deter gulls. Volunteers Chris Crofts and Mike Crofts assisting. (AS)

After consultation with state personnel, it was decided to allow the gulls to nest on the tern island. It was determined that if they were allowed to nest on the island the nesting pairs would defend it from predators and non-breeding gulls. Gull eggs were shaken after the nesting gulls were at least half way through incubation to avoid renesting attempts. The reason for leaving a few nests was so that the nesting gulls would ward off non-breeding gulls and reduce the numbers of nesting gulls. As a result, only five gull chicks hatched out of the 14 nests. This was less time consuming than constantly destroying nests and eggs. In 1989 considerable time was spent on the island destroying 326 gull nests which included many renests. This was both time consuming and disturbing for the nesting terns. A fewer number of gulls were observed on the island this year (an average of 10) as compared to last year (an average of 30). The nesting gulls kept the island free from non-breeding gulls. Although no sightings were made of gulls predating on terns, it is believed that gulls were responsible for the deaths of the two young terns.

In 1990 the island was enhanced for terns by placing 25 decoys on the island and 10 on the dike area. Island decoys were placed in a circle around last year's nesting area, along the water's edge and in vegetation. Care was taken to leave the nesting area open. Previous years nests were located in the middle of the south east half of the island. This area was also sprayed in the fall of 1989 with Rodeo

to knock back the vegetation in the nesting area. This left a fairly bare area in the middle with cover along the edges for the tern chicks to hide.

Several changes were made in this year's tern enhancement efforts. Metal perching stakes were not placed in 1990 after evaluation of the structures in 1989. Observation in that year showed no use of the stakes by terns rather they utilized the stumps and logs. During previous years decoys and taped tern vocalizations were used to encourage terns to nest in the areas. However, because terns were being constantly seen in the general vicinity of the island, vocalization tapes were not used.

Terns first arrived in the area on April 18. At that time there were approximately six Caspian terns and nine common terns near the tern island. After their arrival, the mylar tape was taken down and the decoys were placed on the island. Since there was tern activity on the island, it was judged unnecessary to use the tern recordings as an attractant. The first nests were found on the island on May 18. At this time there were three nests with a total of eight eggs. This was much earlier than last year's first nest confirmation of June 26. The nesting area chosen by the terns was the same general area as last year.

Adult tern bringing food to the island. (JN)

Tern activities were monitored on a daily basis, using binoculars and spotting scopes. Records were kept on various aspects of tern behavior, with emphasis on nesting attempts and roosting behavior (Figure 2). Monitoring was done from the west dike of Pool 1 and the north dike of Pool 4 (lake front dike). Once nests were initiated, actual ground monitoring took place no more than once a week. Ground monitoring consisted of observing for tern and gull nests along the island. Tern nests were marked with orange flags 1 foot to the NW of each nest and labeled with a letter. Gull nests were marked with metal stakes 1 foot NW of each nest.

Area with tern nests marked for ease of location and recording nest starting date. (JN)

During the first nest incubation period, an average of 12 terns were seen in the area. There were approximately 14 nests and 25 eggs on the island during this time (Figure 3). At the beginning of July, four young terns were found and banded. Two were just newly hatched while the other terns were almost full grown. A week after the young were banded another set of nests were initiated. This was believed to have been terns who failed earlier and where renesting on the island. On July 12 a total of 12 new nests were found with 22 eggs. A week later, all eggs except for one had been destroyed by a predator, most likely a raccoon. Also found were two young terns dead with wounds to the breast apparently from gull depredation. It is believed that at least two banded terns survived to fledge. The increased tern activity and successful hatches give hope for establishment of a sustaining colony of terns at Ottawa NWR.

Tern nest with recently hatched young and two pipping eggs. (SS)

Almost fledged young with band found on the island. (JN)

Predation is a major concern of the tern project. Because of the constantly fluctuating water levels in Pool 4 and Pool 5, the island can at times be reached by ground predators. Eleven live animal traps were used to capture predators around the island and dike. Traps were placed along areas where predators could swim or wade to the tern island. Bait was cat food (Fancy Feast Savory Salmon seemed to work the best) or cat food enhanced with fish oil. Traps were checked once a day in the early morning hours. The animals were then relocated to Cedar Point National Wildlife Refuge, six miles away. Traps were closed on weekends was staff were unavailable to check the traps. Raccoon are the most common predators while fox, opossum, and mink are also present. They pose a constant threat to nesting birds on the island.

Predator trapping began May 9 and was completed on July 25. The trapping of ground predators resulted in the capture and later release of 55 ground predators. An increase in predators captured over previous years could be attributed to an increase in the number of traps placed, trapping effort, and improved bait.

Table 17. Animals live trapped and removed from the project area.

Species	1987	1988	1989	1990	Total
Raccoon	17	24	18	46	105
Opossum	10	8	7	2	27
Skunk	0	1	1	0	2
Mink	0	0	1	0	1
Woodchuck	0	0	8	5	13
Fox	0	0	0	2	2
TOTAL	27	33	35	55	150

Human disturbance is also a problem for the study. A boundary fence (snow fence secured with posts) was placed on the beach along the refuge boundary between Crane Creek and the refuge. Signs placed on the fence included refuge boundary signs, refuge area closed signs, and endangered species signs. The fence stretched from the lake front dike through the beach and straight to the water's edge. It was placed during a low lake level and put as far out as possible. Human disturbance along Crane Creek was monitored by actual observations of people in boats in the area. Human disturbance was monitored on the beach by observations of tracks in the sand, observations of people in the area, and vandalism. Human disturbance on the tern island was limited to staff conducting tern observations. Keeping the public off the beach will always be a problem as long as Crane Creek has a public beach area. Signs and fences kept the majority

of people out, but as always a few people chose to ignore the law. Constant wave action and vandalism required continuous maintenance to the fence and signs. The mouth of Crane Creek will also be a constant problem because of fishermen drifting their boats into the refuge. Four persons were caught fishing from shore at the mouth of Crane Creek and were advised to leave. Several persons were found walking on the beach and were asked to leave which they did promptly. On several occasions a boat was seen fishing well within the mouth of Crane Creek. Disturbance from researchers onto the tern island was lessened this year. Once nesting was initiated the island was checked only once per week rather than five times a week. This is a reduction of 57% and could be a major contributing factor to this year's success.

Snow fence and signs placed on the beach clearly indicate that trespass is illegal. (JN)

In August, the east two-thirds of the tern island was once again sprayed with 100 gallons of a 1% solution of Rodeo to control the vegetation for next year. Special attention was made to kill only the central strip leaving the edges for cover. With the help of volunteers and YCC members the island between tern island and the lake front dike was cleared of vegetation. Logs and stumps were left standing to provide perches for the terns. Cleared brush was dragged away from the island. The entire island was then sprayed with 50 gallons of 1% solution of Rodeo. This will provide next year's terns with an alternate nesting location.

This year the tern project, while not as successful as it could have been, was the most successful year resulting in an increase in nesting attempts, hatching of young, and the fledging of young. This indicates that current management practices are having a beneficial impact on the species and the project should be continued.

C. Other Tern Species

The refuge is also used as a migratory stop over for forster's, caspian and black terns. In July approximately 200 terns (approximately 54% forsters, 40% common terns, 5% caspian, and 1% black terns) were observed in the southeast corner of Pool 3. This number included juvenile forster's and juvenile common terns. Another area which was used was Pool 2c which was low in July. The area was used by many different species of terns, gulls, shore birds and ducks from July through September. The sandbar to the northwest of the tern island was also a favorite resting area for terns during the spring and fall.

6. Raptors

A great horned owl captured on film by a refuge volunteer. (CA)

The spring raptor migration is recorded by volunteers from the visitor's parking lot. Unfortunately, the number of observation hours varies greatly each year, depending on the weather. Results for the last six years are as follows:

TABLE 18. Six Year Raptor Observations

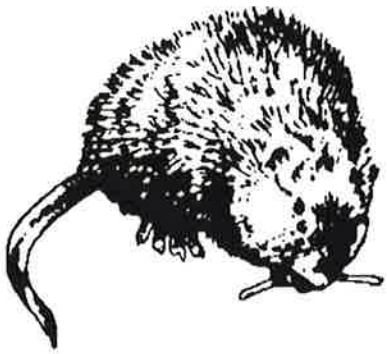
Species	1985	1986	1987	1988	1989	1990
American Kestrel	62	34	2	13	25	9
Bald Eagle	4	4	1	0	1	3
Broad-winged Hawk	15	1226	99	25	29	133
Cooper's Hawk	65	37	14	10	25	41
Golden Eagle	8	0	0	0	0	0
Merlin	2	0	0	0	0	0
Northern Goshawk	2	0	0	0	1	0
Northern Harrier	53	36	7	5	16	29
Osprey	28	5	1	16	2	14
Peregrine Falcon	1	0	0	0	0	0
Red-shouldered Hawk	168	137	43	1	65	178
Red-tailed Hawk	525	397	46	38	239	191
Rough-legged Hawk	15	20	10	10	12	16
Sharp-shinned Hawk	381	232	49	183	186	511
Turkey Vulture	337	458	48	33	822	269
Unidentified Accipiter	4	1	0	0	5	0
Unidentified Buteo	49	19	30	7	22	9
Unidentified Eagle	1	0	0	0	1	0
Unidentified Falcon	0	0	0	0	1	0
Unidentified Raptor	0	0	0	0	1	0
Total # Birds Observed	1720	2606	349	332	1453	1430
Observation Time (Hours)	118.8	103.4	24.5	19.4	59.9	59.8

Banding of raptors also takes place in the spring when volunteer Joe Komorowski conducts banding activities at Ottawa during the months of March through May. This year six red-tailed hawks (one on March 2, three on March 12, one on April 9 and one on May 7), two Cooper's hawks (one on April 19 and one on May 7), and one sharp-shinned hawk (on May 7) were banded. Joe uses a series of nets with a live starling tethered and movable on a string between the nets.

An immature red tail hawk banded by Joe Komorowski during hawk migration activities. (TS)

On December 1, 1989 a golden eagle was brought to the refuge. It was picked up in Defiance, Ohio by a conservation officer the day before. He indicated that he was able to feed it some meat. It was transported to the refuge by an ODNR employee in an open air cage. It appeared not to have any broken bones or external injuries. It was very lethargic, could not fly well and when observed perching would fall over. It was taken to the Detroit Airport two hours before its scheduled flight to Minneapolis, MN (scheduled to leave at 4:20 p.m.). When the eagle was delivered, it was alive but placed in an extremely warm area. It arrived in Minneapolis at 5:15 p.m. and the Raptor Rehabilitation Center advised us that it was dead on arrival. It has now been sent to National Wildlife Health Center for an autopsy. We are concerned that it died either from food poisoning or from mishandling in transport. If it was killed by the transport method, we are interested in correcting this for future raptors. In February 1990, a report came back from the Health Center on the Golden Eagle. All preliminary reports indicated lead poisoning. The carcass was mailed back to us in November. This is a beautiful adult golden eagle specimen and it will be mounted for educational purposes.

8. Game Mammals



Visual observations made of mammals indicate an increase in the rabbit population from last year. Muskrat populations remained stable due to a lessening of the drought and reflooding of a high number of previous drawdowns. Deer populations are up in most areas of the refuge. Raccoon populations were at an all time high and in the fall dead raccoons were seen in many areas. There was apparently a outbreak of distemper which decimated the population.

11. Fisheries Resource

Staff from the ODNR Senecaville Fish Hatchery delivered 1500 channel catfish for stocking in the Cedar Point public fishing area. Fish ranged from 6-14 inches in size. The area is a 15 acre borrow pit open to fishing from June 1 - August 30.

Channel catfish in a holding tank waiting for release. (SS)

14. Scientific Collections

Gypsy moth traps were placed at selected locations on the refuge with positive results (see Habitat Section).

16. Marking and Banding

In May the wood duck boxes were checked for usage. During this time we banded two wood ducks and one hooded merganser female who were incubating eggs. Bands used were from the ODNR Crane Creek research station.

A goose banding drive was done in cooperation with the ODNR at the end of June. A total of 1,573 birds were banded from the refuge, Crane Creek State Park, and Winous Point Shooting Club. Of these, 1,286 (a 100%+ increase over last year's 546) were banded on the refuge and the adjacent state park. This was one of the most successful round-ups recorded. The ODNR received help from refuge staff and YCC. The area round-up took 3 days, used 2 helicopters, refuge airboat, a go-devil and up to 30 people a day.

In September, baited duck trap platforms were placed in Navarre. This was done by the ODNR to aid them in reaching their banding quota for wood ducks in the state. Unfortunately, no ducks were caught; only a few raccoons were caught.

Joe Komorowski, in cooperation with the ODNR biologist, mist netted and banded hawks during the spring migration (see section G-6).

Mark Shieldcastle, ODNR biologist, banded numerous songbirds at Ottawa and Navarre (see section D-5).

Of geese observed in the 1989/90 migration season, only 158 neck collars, of the 600 goose neckband observation quota, were observed by the end of the year. Most of these observations were of the White/Black collars placed on local females by the ODNR. A total of 29,311 geese were observed. Volunteers contributed many hours with little success. The mild winter conditions allowed the birds to remain dispersed and in fields off the refuge, making observations extremely difficult to obtain.

Collars observed in the fall of 1990 (Aug - Dec) totalled 126. A total of 10,960 geese were observed. Seventy-one percent of the collars observed were local birds (white/black collars).

17. Disease Prevention and Control

Chip Pretzman, Microbiologist at the Vector-borne Disease Unit in Columbus, conducted transects at Butternut Lodge and Navarre to check for Deer ticks on November 27, 1990. He found no ticks or presence of Lyme Disease.

H. PUBLIC USE

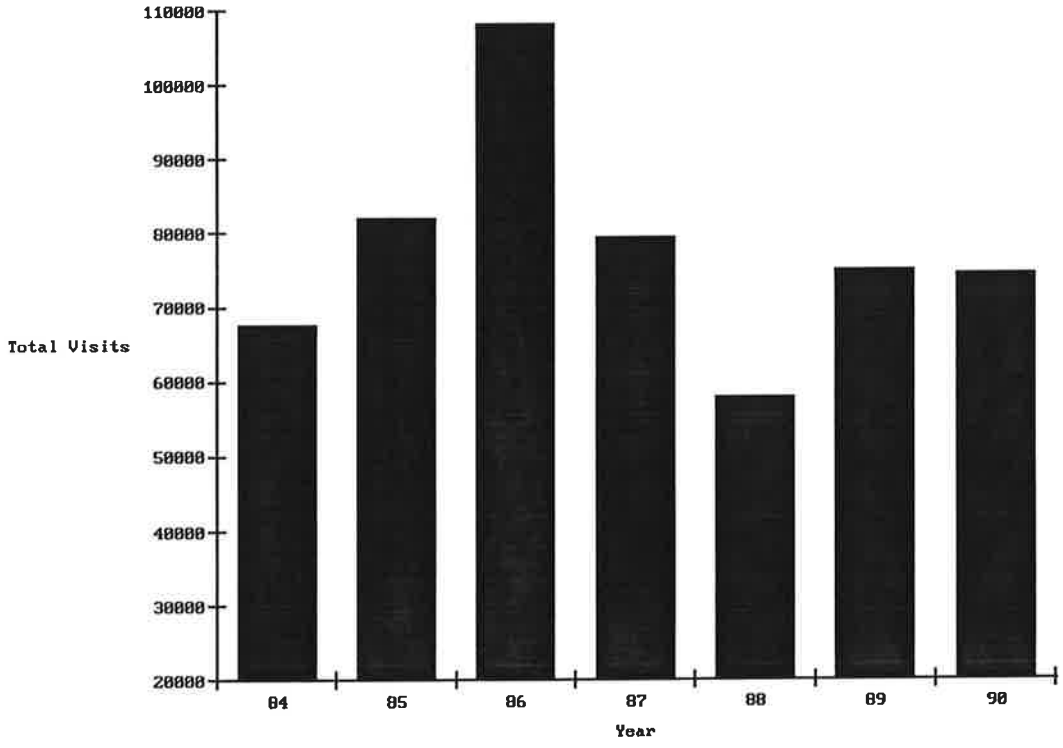
1. General

Ottawa's visitation totalled 74,588 visits for calendar year 1990. The total is based on a car count of 24,094 vehicles traveling the entrance road to the refuge. Visitation reported in 1989 totalled 75,040 based on a car count of 23,297 vehicles. A slight decrease of 1% is given for the calendar year.

A new trail road counter was activated on the refuge entrance road. The system was purchased from Compu-Tech System in Bend, Oregon. The counter is battery operated and monitors vehicle traffic by means of a buried cable. The advanced computer components will hopefully upgrade visitation data and provide more accurate report figures.

Public visitation increased considerably during the spring. The peak visitor use days are on the weekends. ORP Marshall opened the office on several weekends and provided information and programs for visitors. Visitors are restricted to foot access on Ottawa's trails. The visitor parking lot is the initial starting point for all wildlife observation activities. Spring and fall bird migrations attract many visitors to the area. Other increased public use included environmental education for students and teachers, youth programs for scouts and volunteer program projects.

Chart 1. Ottawa Public Use



2. Outdoor Classrooms - Students

Students visiting the refuge and participating in environmental education activities onsite totalled 1,071 visits for 2,673 activity hours. In 1989, 1,034 students visited for 1,827 activity hours. Visits increased 4%; however, activity hours increased by 32%. The activity hour increase can be attributed to increased planned student outdoor classroom activities conducted by visiting educators. Students range from elementary through college level. The standard operating procedure required for educators to visit is first reserve a visit date, and then coordinate activities with the outdoor recreation planner.

Offsite environmental education outreach activities included a Project Wild workshop on 10/20 for students at the Bowling Green State University, Bowling Green, Ohio. ORP Marshall coordinated the workshop agenda and instructed the course with help from refuge volunteer Sandra Woosley, a university student. University staff coordinated registration requirements for university credit. Twenty nine students and educators participated.

ORP Marshall gave a presentation on March 26 to twenty students of the recreation and education department at the University of Toledo. Marshall discussed management evaluations on refuges. The University is utilized for student internships from the recreation department with coordinated efforts by Dr. Steven Ranck. Student intern Edward Daniel completed a sophomore field experience at the refuge in the program. Edward participated in refuge interpretive programs and was exposed to other management projects.

ORP Marshall was invited to three area schools to present career day programs focusing on the mission and goals of the Service. Schools visited included Port Clinton, Genoa High Schools and Oak Harbor Junior High. Programs were presented on 11/2, 11/8 and 11/28. Students participating from all schools totalled 212.

The Ohio League of Sportsman provided approximately 400 National Wildlife Federation packets for National Wildlife Week observed April 22-28. Activities were coordinated in conjunction with Earth Day events. The theme for wildlife week was "Earth Day Everyday-You Can Make A Difference!". A newsletter and packets were mailed to local schools announcing program presentations upon request from refuge staff. Earth Day presentations were given to six local schools in the area. A total of 1,090 students grades K-12 participated in talks and discussions related to environmental problems and remedies. ORP Marshall utilized National Wildlife Federation materials and a supplemental film entitled, "The Giving Tree" by Shel Silverstien. Schools included:

1. Woodmore Elementary
2. Clay High School
3. Shoreland Elementary
4. Starr Elementary
5. Wynn Elementary
6. Graytown Elementary

Table 19 1990 Visiting School Groups

Montessori Elementary Joshua Johnston (student)	Huron, OH	1	Bald Eagle Study	1
Bowling Green Elementary (1-teacher)	Bowling Green, OH	10	Ornithology Study	10
Brynedale Elementary (5-teachers)	Toledo, OH	45	Ornithology Study	90
Northern Kentucky University (1-teacher)	Kentucky	15	Ornithology Study	30
Allen Elementary (6-teachers)	Genoa, OH	50	Wildlife Research Study	125
Rossford Elementary (6-teachers)	Rossford, OH	60	Natural Resource Study	150
Jefferson Elementary (6-teachers)	Port Clinton, OH	310	Natural Resource Study	1240
Girl Scout Special Camp (2-leaders)	Toledo Area Coun.	16	Ecology Study	128
Lourdes College (1-teacher)	Sylvania, OH	12	Emergent Marsh	12

Ottawa Co. 5th Grades (20-teachers)	Ottawa County	525	Resource Conservation Study	788
Ohio State University (1-teacher)	Columbus, OH	15	Ornithology Study	45
Defiance College (1-teacher)	Defiance, OH	18	Wildlife Management Study	54
	Total	1071		2673

The annual fifth grade conservation field day for Ottawa County school students was held on 9/21. A total of 525 students and teachers participated this year. The sponsors of the educational event were Ottawa Soil and Water Conservation District, Ottawa Extension Service, Ottawa County Office of Education, Crane Creek Wildlife Experiment Station and the Ottawa National Wildlife Refuge. This year was the 29th year the event has been sponsored and the 20th year the site of the tour has been held at Ottawa. The student conservation field day originated in 1962 and was held on a private farm in Ottawa County. In 1970 the site of the event was moved to the Ottawa NWR. ORP Marshall and six guest speakers were available at various stops to discuss natural resource and conservation issues (3 stops Ottawa, 3 Crane Creek). Guest speakers conducting presentations this year included the following:

Site Stop

1. Fred Snyder - District Sea Grant Extension Specialist
2. Joel Obrecht - Agriculture Stabilization and Conservation Service
   Matt Duncan - U.S. Soil Conservation Service
3. John Morton - Division of Wildlife, Ohio Department of Natural Resources
4. Neal Leimbach - Ottawa County Extension Agent
5. Mary Ann Miller - Ottawa County Litter Control

Outdoor classroom makes learning fun.

3. Outdoor Classrooms - Teachers

ORP Marshall made many important educator contacts in the area during the year. Educational information disseminated will hopefully provide opportunities to increase outdoor classroom activities on the refuge. A high percentage of classroom instructors still feel compelled to restrict themselves to the classroom environment. Teachers are encouraged to participate in environmental education workshops at Ottawa for curriculum diversity and increased resource awareness.

A total of 168 teachers for 918 activity hours participated in environmental education programs during the year. Total teacher participation slightly increased in 1990 at 2% from 164 teachers in 1989. Activity hours increased 25% in 1990 from 686 activity hours in 1989. A total of 112 educators participated in workshops and 56 additional visits occurred in other educational activities. Project Wild, Project Wild Aquatics, Project Learning Tree and a refuge resource management overview are themes and materials incorporated in workshop agendas. The University of Toledo and Professor Gerry Underfer continued endorsement of Ottawa's teacher workshop program. School superintendents from Ottawa, Genoa, Port Clinton and Oregon school districts have given additional supportive endorsement through the University. Their endorsement permits full college credit received for successful student completion in a workshop.

ORP Marshall conducted workshops with some assistance from refuge volunteers, refuge staff and other professionals from the Ohio Department of natural resources. Six workshops in all were conducted. Workshop dates were scheduled in July on Thursday 26th and Friday 27th, Saturdays October 20th and 27th and Saturdays November 3rd and 10th.

ORP Marshall participated in a live-by-satellite television conference hosted by the University of Toledo Education Department. Environmental education topics for the Great Lakes Region outlined the theme for participant interaction. Facilitator broadcasting from Columbus, Ohio and other regional sites including Canada encouraged participation from monitoring groups by calling central sites. The five hour conference was held on 11/17.

Teachers conduct plot transects and discuss deer carrying capacity.

4. Interpretive Foot Trails

Interpretive foot trail visits totalled 42,447 for 126,614 activity hours for the year. In 1989 41,935 visits for 125,805 activity hours were recorded giving a marginal increase for 1990. Wildlife observation is the activity most visitors participate in on trails at Ottawa. The visitor parking lot nears completion and on-going work seems not to interfere with visitation. Additional trail improvements are on-going utilizing volunteer help. Diketop roads encompassing over seven miles with remanent Black Swamp forest woodlot trails are open to the public for foot access daily during daylight hours. Five interpretive panel bench sites provide management and wildlife information.

Newly installed gates and guardrails enhance parking lot.

6. Interpretive Exhibits/Demonstrations

The refuge staffed five offsite exhibits in 1990. Free standing system 70 and nomadic system exhibits were utilized. Exhibits on loan from Washington and the Regional Office audio visuals departments were incorporated into theme messages. The on loan materials were temporarily exhibited in the headquarters forum for public exposure.

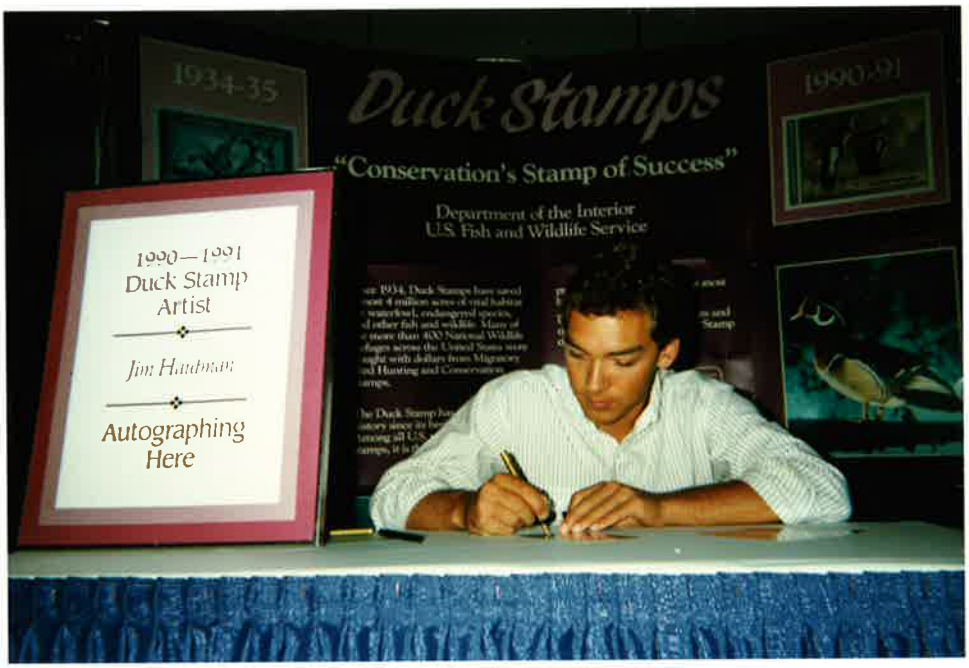
Refuge staff and volunteers assisted in staffing a refuge booth set up at the Toledo Sportsman's Show. The show was held March 1st through March 4th at the Toledo Seagate Center. The show has only been held for three years and this is the first participation by the Ottawa NWR. The show provided excellent exposure for the Service and refuge programs. Questions asked included information on farm bill activities, bald eagle nesting success and other refuge resource opportunities.

Volunteer Ed Daniel helps man exhibit at SeaGate.

Two offsite exhibits were set up and manned by ORP Marshall for Earth Day and Earth Week awareness. Refuge System messages and values of the Federal Duck Stamp were exhibited. Exhibits were held at the Bowling Green State University campus, Bowling Green, Ohio and the Secor Metropark in Toledo. Both events were well attended. Two duck stamps were sold during the duck stamp exhibits.

One offsite exhibit was set up and manned by ORP Marshall at the Toledo Zoo. The system 70 panels with environmental education messages for teachers were used. A touch table was also included and gained the interest of many young school students. The exhibit was held on Friday, May 18th from 11:00 A.M. to 4:00 P.M.

ORP Marshall was detailed to assist Federal Duck Stamp officials from Washington in exhibiting and selling of stamps and collectibles. The American Philatelic Society sponsored the event held in Cincinnati, Ohio on August 25th and 26th in the Convention Center.



Duck Stamp Artist Jim Hautman honors request for autographs.

The refuge participated in the Ohio Wildfowlers Festival and Decoy Contest held on 9/30 at the Crane Creek State Park. The event is coordinated by local conservation groups and the Ohio Department of Natural Resources. ORP Marshall and volunteer Sandra Woosley staffed an exhibit displaying Pittman-Robertson hunter information. A total of 43 duck stamps were sold at the event. A second exhibit, the duck Stamp nomadic system was exhibited non-staffed in the museum of the Wildlife Experimental Station's Headquarters. The event was attended well by the public.

7. <u>Other Interpretive Programs</u>

Interpretive programs varied and were given to interest groups of all ages. Listed below are examples of interpretive programs requested.

Refuge Manager Blair was a guest speaker on the evening of January 9th at a meeting of the Lake Erie Waterfowl, Oregon, Ohio. Blair's presentation was on the wetland restoration program. However, there was much discussion concerning the refuge and current management programs. The information exchanged was very positive.

Refuge Manager Blair spoke to a group of 50 members of the League of Ohio Sportsman's annual waterfowl symposium in Richfield, Ohio in February. The two topics covered were wetland restoration and construction activities on Ottawa NWR.

Refuge Manager Blair spoke at the annual meeting of the League of Ohio Sportsman in Dayton, Ohio on February 23rd. The presentation was on the wetland restoration program in Region 3.

A general presentation was given by ORP Marshall on march 26 at the St. John Lutheran Church in Port Clinton, Ohio. The presentation was given to 300 boy scouts and parents for an annual dinner banquet.

The Merrygold Garden Club, a local group, visited the refuge on Tuesday, April 10th and were given a general slide presentation. ORP Marshall conducted a tour that followed the presentation for six members.

Refuge Manager Blair spoke at Terra Technical's Earth Day celebration on Sunday April 22nd. The presentation included the value of wetlands and an overview of the Service's wetland restoration program.

On Sunday April 28th, Refuge Manager Blair spoke at a meeting of the Maumee Valley Audubon Society at the Oak Openings Metropark in Swanton, Ohio. Wetlands were the focus of the talk with special emphasis on the Service's wetland restoration program.

ORP Marshall was invited to give a 30 minute presentation on Ottawa's non-game management to the Toledo Naturalist Association at the Anderson's Park in Toledo. A total of 200 members attended the program on May 19th.

The Maumee Valley Audubon group of ten members visited the Cedar Point NWR for a 3-hour birdwalk led by ORP Marshall on April 21st.

ORP Marshall visited the St. Peter Lutheran Church in Graytown, Ohio on June 22nd. He gave a presentation to 70 bible school students and their parents. Refuge management programs and a film entitled "Wildlife Babies" was shown.

ORP Marshall was invited to Fremont Ross High School in Fremont, Ohio to participate in career day activities. The presentation was given on February 21st and included conducting four sessions showing the video tape "The U.S. Fish and Wildlife Service, A Challenge and An Adventure." Approximately 90 students attended all sessions. Refuge brochures were provided, and Service career questions were answered.

ORP Marshall gave a general slide presentation to ten members of a local group in Oak Harbor, Ohio on 9/18. The Ohio Child Conservation League was the name of the group.

8. Hunting

Canada, snow and white-fronted geese and ducks are hunted by permit on portions of Ottawa Refuge. Snow and white-fronted geese occur in such small numbers on the refuge that they are rarely taken during the hunt. Ducks are included in the permitted bag with geese. The hunt is conducted from blinds in and around agricultural fields. Hunting occurred on non-consecutive days from October 18 to November 24 and this year was the 15th consecutive year for the hunt. A cooperative agreement provides for the hunt to be administered by the Ohio Department of Natural Resources. Personnel from the Magee Marsh Wildlife Experimental Station run the program completely.

This season 2,554 hunters applied to hunt on the Ottawa Refuge with 264 permits issued (2 hunters per permit). The 528 hunters participating in this year's hunt accumulated 2,315 activity hours. Hunters from 48 Ohio counties and 4 states (Kentucky, Michigan, Pennsylvania, and Virginia) participated in the hunt. The top five counties in Ohio where the applications were received from were Cuyahoga, Lorain, Summit, Ottawa and Lucas.

In 1990, 463 hunters harvested 112 geese (including one snow goose) for a hunter success of 24% in 22 hunt days. Hunt days were limited to shooting hours from sunrise through 12:00 Noon only. Duck season

was closed from October 29 through November 5. This allowed only 17 hunt days for ducks to be harvested. Duck harvest totalled 37 birds for a hunter success of 8%. There were 21 mallards, 7 black ducks, 6 green-winged teal, 2 pintails, 1 wood duck. The 1990 season marked the 5th year ducks could also be harvested.

TABLE 20. Canada goose populations, Ottawa National Wildlife Refuge, September 1, 1986 to January 15, 1991.

	1986	1987	1988	1989	1990
09/01	3,282	930	1,000	1,050	600
09/15	4,270	1,110	3,620	1,750	540
10/01	6,037	4,540	4,300	3,020	2,305
10/15	9,450	11,350	4,300	5,075	3,700
11/01	8,620	10,975	8,630	14,840	7,850
11/15	10,075	16,790	9,550	7,950	6,800
12/01	16,725	15,365	5,575	5,000	5,335
12/15	13,860	15,095	5,100	1,720	8,320
01/01	13,310	6,015	2,550	1,600	8,255
01/15	9,965	5,400	8,900	2,800	8,050

TABLE 19. A Five Year Comparison of the Goose Harvest on Ottawa National Wildlife Refuge.

	Number of Hunters	Number of Geese	Goose Hunter Success	Number of Ducks	Duck Hunter Success
1986	529	144	.27	42	.08
1987	518	207	.40	38	.07
1988	566	165	.29	12	.02
1989	474	124	.26	70	.15
1990	463	112	.24	37	.08

9. Fishing

Refuge sport fishing is limited to a 15 acre borrow pit at Cedar Point NWR from June 1 to August 30. Visitors are required to possess a valid state fishing license. Random license checks were conducted during the fishing season to monitor regulation guidelines. Tickets were issued for trespass only, although many of the people had fishing poles with them (see section H-17). A total of 672 visitors for 2,353 activity hours participated in fishing the site. Maximum use seems to occur during weekends. A majority of the fishermen checked were senior citizens. Fishing success was the best during the month of June. Sport fish harvested were blue gill, crappie, bass, and channel catfish.

Staff from the ODNR Senecaville Fish Hatchery delivered and stocked 1,500 channel catfish in the Cedar Point refuge public fishing access area in October. Channel Catfish ranged from 6 - 14 inches in size. These fish should increase fishing opportunities in the future.

Channel catfish in a carrying tank during transfer into the Cedar Point borrow area. (SS)

10. Trapping

The refuge is divided into 13 units. Cedar Point was closed to trapping again this year due to a decrease in muskrats and an infestation of cattail. Cedar Point includes units 1, 2, 3, 4. Unit 9, a major area for public use, remained closed to trapping bid again this season. It is hoped that it will be trapped in 1991 in conjunction with a Youth Trapper education course as the unit is over run with muskrats and is lacking in cattail.

Units which were open to trapping were units 5, 6, 7, 8, 10 (Ottawa), Unit 11 (Woodies Roost), Unit 12 (Navarre), and Unit 13 (Darby). Trapping of mink, racoon, fox, opossum and skunk was permitted with regulations remaining the same as the previous year. Trapper selection was made on open units by sealed bids. Although fur prices were down this year, 9 people submitted 20 bids. The five highest bidders gave bids totalling $3,345.94 to trap units on the refuge.

The number of youth units were decreased this year due to the lack of interest from last year. The units normally reserved for youth was placed up for bid to get a higher trap effort in the units. Six youths applied for three areas available for youth trapping units (Show Pool, Goose Pen, and HQ pool). For the season youth trappers took 280 muskrats, 2 mink, 3 raccoon, and 1 fox.

Table 22. Reported Fur Harvest for the Past Seven Seasons

	84-85	85-86	86-87	87-88	88-89	89-90	90-91
Muskrats	5,603	4,921	8,776	6,916	226	1,984	2,637
Racoon	64	75	104	144	34	68	122
Mink	9	16	17	42	10	29	34
Skunk	8	5	4	3	1	7	4
Opossum	21	56	34	43	12	20	36
Fox	10	7	7	24	5	15	6

Table 23. Income from the last seven seasons.

	Number of Units Trapped	Total Income
1984-85	11	$ 12,694.29
1985-86	11	$ 7,726.60
1986-87	10	$ 10,675.89
1987-88	11	$ 13,420.38
1988-89	6	$ 4,101.25
1989-90	5	$ 2,797.74
1990-91	8	$ 3,345.94

11. Wildlife Observation

The wildlife observation occurring at the Ottawa Complex occurs basically on the Ottawa Unit. Limited permitted use occurs at Ottawa, Darby Marsh or the Cedar Point. Public use is restricted on West Sister Island NWR. The Navarre Marsh unit activities are limited because of Toledo Edison's nuclear plant (Davis-Besse). Special use permit authorization is required to visit all units except Ottawa's public trails.

A public evening Owl Hoot was conducted on Sunday, March 11th at 6:00 P.M. A general slide program was given by ORP Marshall. Volunteer Mike Crofts discussed owl species indigenous to the area. Other volunteers assisted with the owl hoot guided walk. Approximately 20 visitors and volunteers attended.

A Maumee Valley Audubon group was issued a special use permit to enter Ottawa's Navarre Marsh unit. The group visited the area to bird and assist Department of Natural Resources biologist, Shieldcastle band passerines in May.

Volunteer Jeff Stefanelli visited the refuge on 8/2 with twelve grade school students from his community. ORP Marshall gave an introduction and showed the film "Wildlife Babies."

Four Sierra Club members from Huron County visited the refuge on 9/15. ORP Marshall gave a general slide presentation. It was later followed by a self-guided walk by the group.

A church group of fourteen elementary school girls and leaders named Stars visited the refuge on 9/29. The group visited from the New Life Assembly of God Church in Oregon, Ohio. ORP Marshall showed the film "America's Wetlands." A discussion of Ottawa's wetland significance and an area tour followed the film.

A public birdwalk was conducted by volunteers on 10/21 at Ottawa NWR. Public response was excellent with approximately 20 visitors attending.

17. Law Enforcement

Three refuge staff possessed law enforcement authority at Ottawa for CY 1990. Staff included Refuge Manager Blair, Assistant Manager Siekaniec and ORP Marshall.

Assistant Manager Siekaniec attended refresher training in Des Moines, Iowa during the week of March 12. Refuge Manager Blair and ORP Marshall attended refresher training the following week.

On September 13 Refuge Manager Blair, Assistant Manager Siekaniec And ORP Marshall attended a law enforcement qualification at Shiawassee NWR. Despite dense fog which prevented regional range instructors from attending, refuge officers were qualified by an F.B.I. agent.

Assistant Manager Siekaniec assisted in waterfowl law enforcement efforts October 26-28 at LaCrosse District of the Upper Mississippi Fish and Wildlife Refuge.

ORP Marshall was detailed to participate in LE activities for opening waterfowl season in Bay City, Michigan. Patrol efforts were concentrated in the Saginaw Bay area from 10/11 through 10/15. Law enforcement officers assisting included FWS Special Agents from Ohio, Louisiana and Michigan, refuge officers from Ohio and Michigan and conservation officers from Michigan. Violations ranged from baiting to unsigned waterfowl stamps.

Law enforcement efforts for waterfowl season concentrated on problem areas near refuge units. The resident special agent coordinated enforcement activities with assistance from Ottawa refuge officers, Louisiana FWS special agents and state conservation officers. Special attention was directed to Cedar Point NWR and adjacent state management areas. Some infractions occurred in this unit earlier and required monitoring lake front boundary areas for encroachment.

The refuge was informed of two individuals trespassing and possible illegally taking deer from the Darby Marsh unit of the Ottawa Complex. ORP Marshall investigated and did find that evidence indicated an animal had been shot and removed from the refuge. Two eyewitnesses were interviewed and provided information identifying local individuals as suspects. Special Resident Agent Dan LeClair and refuge Officer Charles Marshall interviewed two violation suspects from Oak Harbor, Ohio. An admission was received from both during the interview for trespass and unlawful taking of deer from the Darby Marsh unit in January.

Random law enforcement patrols were conducted at Cedar Point NWR. A lake front shoreline beach area there is an open invitation for prohibited activities such as beach combing and sunbathing in the closed area. This restricted area is sensitive to any public use because it is a bald eagle nesting zone. Violations occur as warmer weather develops and continues into summer months. Violation notices were issued to individuals disregarding posted boundary signs and beach access closed signs. Illegal entry into the area is generally by boat.

Violation notices were issued to individuals for trespass by vehicle on the Ottawa unit during the year. New gates were constructed and installed in the Ottawa visitor parking lot and will hopefully correct trespass problems that occurred in the past.

A visitor reported her personal vehicle was broken into during a visit to the refuge on May 27. The vehicle was left locked with windows cracked for ventilation. Someone or individuals gained entry and removed a purse placed under the seat of which contents taken included $7.00 in cash, keys and prescription eye glasses valued at $100.00. No other items or vehicles were disturbed and no damage occurred to any parts of the vehicle. The incident occurred on a Sunday afternoon with no eyewitness.

Violations

Table 24. Summary of 1990 Citations

Violation	Citations	Disposition
Unlawful take of deer	2	$600 fine, hunting rights suspended for 2 years
Unlawful take of turtles and transport	1	$800.00 forfeited
Trespass and animal/bird disturbance (Bald eagle nest zone)	3	$50.00 each forfeited
Vehicle trespass in closed area	1	$25.00 each forfeited
Trespass	3	$25.00 each forfeited

20. **Take Pride**

Final Duck Stamp sales for the year totalled $1,237.50. Golden Passport sold for the year totalled $100.00.

Boy/Girl Scouts

Boy Scout troop 88 from, Toledo Ohio visited the refuge on Tuesday April 17th to conduct activities for merit Badge requirements. Fifteen scouts and leaders policed refuge trails for litter, cleaned branches from lawn areas and flagged woodchuck holes on dikes. ORP Marshall coordinated activities and presented a slide show.

The Toledo Area Council of Boy Scouts of America coordinated a visit to the refuge on Saturday April 21st to conduct activities for merit badge requirements. Sixty scouts, parents and leaders were assigned problem litter areas to clean-up. The group collected two pickup truck loads of trash and debris. Educational programs were given to the group by a guest speaker invited by the group and ORP Marshall ended with a short program.

A girl scout "Specialty Camp" with members from the area and Toledo visited the refuge and camped at the Butternut Lodge site. ORP Marshall conducted discussions and E.E. activities to complete ecology merit badge requirements. A total of 16 girl scouts and five leaders participated in June.

A boy scout troop east of Cleveland in the Chargin Falls, Ohio area visited the refuge on 8/18. Ten scouts and leaders were given an introductory slide program by ORP Marshall and then a non-guided trail hike and birdwalk were taken.

Boy Scout Explorer Post #337 from Bloomdale, Ohio visited the refuge for a two night camping trip. A special use permit was issued to 12 scouts and their leaders to use the Butternut Lodge cabin area and visit West Sister Island NWR. The Coast Guard Auxiliary provided boat transportation to the island. The group policed shoreline areas on West Sister for trash as a Service project on 8/25. Friday 8/24 and Saturday 8/25 were camping nights on the Ottawa refuge.

Scouts again visited the refuge in October to participate in Merit badge activities for the Take Pride and Service patches. Service projects included tail maintenance and facility rehabilitation. Two groups totalling 210 scouts participated in the refuge program.

Scouts assist with on-going trail maintenance.

Butternut cabins get a face lift by Scouts.

I. EQUIPMENT and FACILITIES

1. New Construction:

Darby Dike/Ditch Rehabilitation: Mannig Enterprises was continued this year to finish the ditch and dike repair and installation of two water control structures at Darby Marsh. The work was completed without any problems during the summer months. Total cost of the contract was $402,445.00.

Cedar Point Pump Station: This contract for the installation of two 60 horse power pumps in the Cedar Point Unit was completed in August of 1990 at a final cost of $311,918.00. Work in 1990 primarily consisted of installation of the 1/2 mile underground electrical line and hook up and testing of the pumps. They were first put to use in August in trying to maintain the water levels in the 1500 acre marsh. With dry weather and heavy cattail growth, one 12,000 gallons per minute pump, running 24 hours per day, could barely keep up with evaporation/transpiration losses.

Darby Pump Station: This contract including the installation of two 16 inch, 20 horse power pumps in the Darby Marsh Unit was completed by August and used to fill the units this fall. These pumps, like the Ottawa and Cedar Point pump stations, allow us to drain or fill the marsh units in spite of Lake Erie. Cost of this station was $185,816.00.

Moist Soil Unit 7/ Mini-Marsh Dike Construction: This contract was awarded in 1989 to Four-Star Construction of Cleveland under the minority construction procedures. All work was sub-contracted to Gradel Construction of Toledo, Ohio. Work commenced in January and was completed in early summer at a total cost of $285,265.00. This project was only the dike construction portion of this project. All rip-rap and some of the minor dike repair was eliminated to stay under the available funds. This was the last of the flood damage funding.

A separate contract for $48,650.00 was issued to Gradel Construction in August for the purchase and placement of 3500 tons of rip-rap on the most exposed sections of the exterior of this dike. This work was completed by November 1st.

Farm Unit 12 Wetland Dike: A 600 foot dike was constructed in old farm unit 12 to create a 10-12 acre wetland in the corner of this unit near the entrance road. The work was done using force account funds with refuge equipment.

2. Rehabilitation

Cleaning of MS Pump ditch: The cleaning of the main ditch from Crane Creek to the Moist Soil Pump continued using the Northwest dragline for the cleaning of the muck and resloping of the west bank. Filter Fabric and stockpiled No. 1 rip-rap was placed on the west slope and additional rip-rap placed on the east slope. The concrete block riser was lowered to allow additional water to flow into the intake pipe during low water periods.

Rehab of North MS6 dike: A 1200 foot dike on the north side of MS6 was rebuilt using the rental JD 650 dozer between farm bill work periods.

Office/Shop Roof: A bid was submitted for the office and shop roof reshingling. The only bid received was for $24,000.00. This was considerably over the engineering estimate and the available funds of $16,000.00. The bid was not accepted and the project was done using force account funds. Materials were purchased and a MAT team was brought in to do most of the work. Approximately $10-11,000 was spent including materials, travel costs, overtime, etc. Some minor work remains to be completed.

The old oil-fired office furnace system was replaced with a new propane Lennox pulse unit, and the floor was insulated. This was done under contract with Taggart Heating for a cost of $17,963.00.

Other Items: A contractor with a JD 790 excavator was hired to clean the Mini-Marsh and a portion of the Krause Road ditch. A contract was issued to GLIC Environmental of Toledo for $7350.00 for the removal of the three underground gasoline/diesel tanks at the shop area. This work was done in October and contamination was found. Work has been suspended until a removal plan and environmental assessment can be written and approved, and additional funds can be obtained for the cleanup.

MS Pump ditch was cleaned and rip-rapped. (SC)

BEFORE

Maintenance shop has roof replaced by Job Corp.

AFTER

4. Equipment Utilization and Replacement

A JD 650 bulldozer with 8.5 foot angle blade and trailer was rented for 3 months (July -Sept) for the farm bill work.

A new Terrain King 15 foot batwing type rotary mower was purchased to replace the aging Woods mower for mowing of dikes, fields, etc. Other miscellaneous purchases included a small utility trailer for hauling ATV's, a John Deere All-Materials Transport with 600 pound capacity, Laser level.

Two new S-10 pickups and a new S-10 Blazer were received and put to immediate use.The older vehicles were retired. Two additional pickups were ordered during the year.

Major repairs included the backhoe hydraulics, dump truck engine, White tractor transmission, Allis-Chalmers tractor air conditioning system, supports on the Mo-Trim mower, fuel tank and miscellaneous items on the 3010 tractor.

Ottawa's fleet for the 90's.

6. Computer System

The office computer system was expanded from the old IBM-AT with the purchase of three new Dell units, including a 386SX, 20 mh system with a 100 megabyte hard drive. The necessary cabling and automatic control switch was purchased to connect three of the four office computers to the LaserJet printer. The system is working very well and all office personnel are using the computer system to some degree. Software upgrades to WordPerfect 5.1 and Rbase 3.1 were obtained.

8. Other

Two above ground fuel tanks were delivered to replace the underground fuel tanks. The old tanks were removed.

Waiting for permanent installation.

A new high radio system was installed at Ottawa NWR. Most vehicles are fitted with the new radios plus two portables were purchased. This will allow refuge employees to contact not only refuge headquarters, but state and local law enforcement officials as well.

Installation of new high band antennae.

Refuge office porch gets needed attention.

J. OTHER ITEMS

1. Cooperative Programs

Memorandums of understanding conducted between the Ohio Department of Natural Resources and the U.S. Department Of Interior, U.S. Fish and Wildlife Service active during the year is as follows for the calendar year: 1. Cooperation in the production of Canada Geese in the State of Ohio (banding operations), 2. Cooperation in the managed hunt program of Waterfowl on the refuge, 3. Common Tern management with reimbursement to the Service from the State of Ohio, 4. Research management study of the heron rookery on West Sister Island Refuge.

A cooperative program continues to exist between the Toledo Edison Electric Company and the U.S. Fish and Wildlife Service for management of the Toledo Edison owned Navarre Marsh unit as part of the Ottawa Refuge Complex. Refuge personnel provide a management plan for water manipulation of the unit, and Toledo Edison personnel are responsible for oversecing the regulation of water levels.

The Ohio Audubon Council donated funds for construction of an observation platform at the Ottawa visitor trail. The refuge will match contributions for this project through the challenge grant program. Staff will coordinate and begin construction in early 1991. The Audubon Council has also assisted the refuge with other projects through the adopt-a-refuge program in past years.

3. Items of Interest

Training Attended for the Year:

Blair:
Executive Management Program, Penn State, PA
Evelyn Wood Reading Dynamics, Toledo, OH
LE Qualification, Shiawassee NWR
Time Management, Cleveland, OH
Wetland Invertebrate Workshop, Puxico, MO
LE Refresher, Des Moines, IA

Cornelius:

Supervisory Workshop, Toledo, OH
Time Management, Cleveland, OH

S. Siekaniec:

LE Duty, LaCrosse, WI
Fire Management Training, Jackson, Wyoming
Time Management, Cleveland, Ohio
Pesticide Applicator Training School, Columbus, OH
Waterfowl Disease Workshop, Schroeder, WI
Woodcock Wingbee, Nashville, TN
LE Refresher, Des Moines, IA
LE Qualification, Shiawassee NWR, Saginaw, MI.
Farm Tractor Certification, Oak Harbor, OH
Boater Safety Course, Oregon, OH

Miller:

Time Management, Cleveland, Ohio
Women's Stress Clinic, Toledo, Ohio
MS-DOS Training, Univ. of Toledo, Toledo, Ohio

Marshall:

Time Management, Cleveland, Ohio
Effective Promotional Writing, Minnesota Valley NWR
National Interagency Workshop, Salt Lake City, Utah
Refuge Law Enforcement Refresher, Des Moines, IA
Boating Safety Classes, Oregon, OH
Public Use Workshop, Minnesota Valley NWR
LE Qualification, Shiawassee NWR, Saginaw, MI
Farm Tractor Certification, Oak Harbor, OH

Jeff Nagel:

Farm Tractor Certification

Thomas Siekaniec:

Farm Tractor Certification

Revenue sharing checks for FY 90 were mailed in April to Ottawa and Lucas County Treasurers. Ottawa County received $17,883.00, Lucas received $26,583.00, both totalled $44,466.00.

Wildlife Associate Manager Matthias Kerschbaum visited the refuge on January 9th and 10th. Kerschbaum participated in the farm bill evaluation and discussed refuge operations with Refuge Manager Blair. A visit was made again by Kerschbaum to the refuge on December 18th and 19th.

Bill Hutchinson, Assistant Wildlife Associate Manager 2, visited the refuge on April 30th. Bill got a first hand look at refuge operations and also spent a day on private lands effort with a trip to Lenawee County, Michigan.

ORP Marshall was interviewed in May by Karen Mason, a news broadcaster from WTOL-TV Channel 11 in Toledo. Information and video were taken of Ottawa's resources and educational programs to be used in a news segment entitled "Earth Watch."

Assistant Manager Siekaniec attended a public lands committee meeting for the North American Plan on June 14. Many good ideas were brought up.

Jeff Leach(RO-Private Lands) visited the area on July 16th and was provided a tour of the refuge and the surrounding area. Jim visited several wetland restoration projects in Michigan and Ohio.

Refuge Manager Charles Blair attended a news conference on September 21st with Congresswoman Marcy Kaptur. Congresswoman Kaptur announced the funding of the Lake Erie Shoreline Study in the amount of $198,000. She also stated that she is eagerly awaiting the results of the study so she can begin funding the project.

The Lake Erie Marshes Implementation Team (North American Waterfowl Management Plan) met on September 27th at the Crane Creek Wildlife Experimental Station in Oak Harbor, Ohio.

John Beall, Regional Representative of Pheasants Forever spoke on that organization and its role in wetland restoration. Other business included an update on the Lake Erie Marshes Plan, U.S. Fish and Wildlife Service Challenge Grants and funding under the Wetland Conservation Act.

Refuge Manager Blair attended the WAM2 Project Leaders meeting held in Northfield, MN on August 20-22, 1990.

Regional Engineer John Ramsour visited the refuge on October 17th and 18th to inspect construction projects and assist the State of Ohio in designing the Pickerel Creek Wetland Restoration Project.

Refuge Manager Blair conducted a Lake Erie Implementation Team Meeting (NAWMP) on October 25th.

ORP Marshall participated in a research/education facility needs workshop coordinated by Doug Wilcox and Habitat Assessment staff, Ann Arbor, MI. The workshop was held on 10/29 and 10/30 at the Seagate Conference Center of the University of Toledo. Educators and conservation professionals from area universities and field stations participated.

Jim Mattssen visited the refuge on November 13 and 14. He assisted staff in reviewing and advising on their wetland management for an upcoming plan. The refuge staff found his comments helpful in preparing and focussing on overall management for the writing of the plan.

Refuge Manager Blair attended the "Executive Development Program for National Managers" at Penn State University during December 3-13.

Refuge staff held the annual Christmas dinner party on December 16th in the evening at the Oak Harbor Hotel Restaurant. Staff and volunteers attending totalled 24.

Refuge Manager Blair meeting with Wildlife Associate Manager, Matthias Kerschbaum.

4. Credits

We would like to thank everyone who helped put together this report:

Blair:	Intro., Index, Sections A, C, D, E-1, F-14, F-16, and K
Cornelius:	Sections E-5, E-7, F-4, F-5, and I
S. Siekaniec:	Sections B, D-5, E-4, E-7, E-8, F, G, H-8, H-10, and J-4
Marshall:	Sections E-2, E-3, E-6, H, J-1, J-2, J-3, and L
T. Siekaniec:	Section F-15
Miller:	Typing and putting it all together

Photo Credits

AS - Al Schlect
AW - Art Weber
CA - Chris Ashley
CB - Charlie Blair
CM - Charlie Marshall
JF - Jim Fuehrer
JN - Jeff Nagel
MC - Mike Crofts
MG - Mary Gloer
SC - Stan Cornelius
SS - Sandra Siekaniec
TH - Todd Haines
TS - Thomas Siekaniec

CEDAR POINT NATIONAL WILDLIFE REFUGE

Cedar Point NWR is administered as a unit of the Ottawa Complex. The refuge contains approximately 2,500 acres and is entirely marsh except for the dike system. A dike system isolates the marsh from the adjacent Lake Erie and divides the refuge into three pools. All pools are predominantly cattail, bulrush and other emergent vegetation. The pools are managed to provide stable water levels which are lowered during the summer months only to the extent necessary to encourage aquatic vegetation.

The refuge provides habitat for migrating waterfowl and other marsh and water birds, and marsh nesting habitat for a variety of birds. Herons and egrets make extensive use of the area for feeding.

The nesting pair of bald eagles at Cedar Point NWR did successfully nest this year in the artificial nest put up by the state. An eaglet was fledged at the refuge this year (see G.2 for details).

Duck populations peaked during the fall migration and in the spring. Canada geese peaked in spring and in the fall (see section G-3 for more information).

Construction in the Pheasant Farm and Pool 1 required the pools to be pumped dry. As a result, waterfowl use in the summer was minimal. The drawdown conditions also made it difficult to control Purple Loosestrife as well as encouraging its growth. Approximately 22 acres of loosestrife was sprayed with Garlon 3A (see section D-5, Ottawa WMS39).

The borrow pit near the Yondota gate which is used as a fishing area was stocked with channel catfish in October. (For more information see section G-11.)

Roads were not graded and only mowed once due to manpower shortages and Farm Bill work. A few of the roads were redone during construction. Roads are beginning to deteriorate significantly.

WEST SISTER ISLAND NATIONAL WILDLIFE REFUGE

West Sister Island is an 82 acre island located in the western basin of Lake Erie. It is jointly owned by the U.S. Coast Guard and the U.S. Fish and Wildlife Service. Five acres, including the lighthouse, are owned by the Coast Guard but managed along with the other 77 acres by the U.S. Fish & Wildlife Service as a wilderness area. Tall hackberry trees with an understory of abundant poison ivy 12 feet tall dominate most of the island. Great Solomons-Seal reaches 7-9 feet in height and a great variety of ferns, wildflowers, mushrooms, and plant life abound.

The island is composed of glacial fill over a limestone shelf. The limestone shelf protrudes along the island showing where large coves have been eroding by hydrological forces. There are no sand beaches but rather two rocky shoals for access to the island. The soil contains a great amount of clay and loam and humus layers which annually receives a topically applied layer of nitrogen supplied by the thousands of nesting birds.

West Sister Island is noted for having the largest heron/egret rookery in the Great Lakes. Great blue herons and black-crowned night herons comprise 90% of the nesters.

Herring and ring-billed gulls are the second largest group of nesters. Cattle egrets, snowy egrets, little blue herons, Canada geese and assorted ducks also nest there.

Four special use permits were issued this year. Two were for research purposes. One was a continuation of a research on the island population of garter snakes and water snakes. Unfortunately Dr King was unable to make it out to the island this year. The other research was for a *Drisophila* study. This was also a continuation study by R.C. Woodruff and Mark Gromko. They also were unable to visit the island. A boy scout group was given a special use permit to visit the island for cleanup efforts. They were transported to the island by the Coast Guard. The remaining permit was issued to Dr. William Scharf to conduct a colonial nesting bird survey on the island. This was done by float plane and under contract with the Fish and Wildlife Service.

No trips were made to the island this year by the black-crown night heron researchers. (See WMS28 in section D-5.). No trips were made by the refuge staff due to the work load of the station.